HEARING EXAMINER EXHIBIT LIST

PROJECT:	Public Hearing for Preliminary Plat and Planned Residential Development for Belmont Terrace
FILE NUMBER(S):	PLPRD2019-01
APPLICANT:	CPH Consultants
HEARING DATE AND LOCATION:	**July 16, 2019 at 3:00 PM** Monroe City Hall Council Chambers 806 West Main Street, Monroe, WA 98272

EXHIBITS

1. Staff Analysis
2. Vicinity Map
3. Preliminary Plat Map
4. Preliminary Plat Application and Project Narrative
5. Letter of complete application
6. Notice of Application
    - 6- A Affidavit of Publication
    - 6- B Affidavit of Posting (On Site)
    - 6- C Affidavit of Posting (CH_Library)
    - 6- D Affidavit of Mailing
    - 6- E Email to Public Agencies (NOA)
7. Public Comments
    - A. Letter from Snohomish County Public Utility District #1
8. SEPA - Determination of Non Significance (DNS)
9. Notice of Public Hearing
    - 9- A Affidavit of Publication NOPH
    - 9- B Affidavit of Mailing
    - 9- C Affidavit of Posting (On Site)
    - 9- D Affidavit of Posting CH)
10. Preliminary Landscape Plan
11. Conceptual Road, Drainage, and Utility Plan
12. Stormwater Drainage Report

13. Geotechnical Report
14. Traffic Report
15. Deviation Request
16. Wetland Report
17. Power Point Presentation by Anita Marrero, Senior Planner

MONROE WASHINGTON	**STAFF REPORT AND RECOMMENDATION** **Belmont Terrace** Public Hearing for Belmont Terrace Preliminary Plat and Planned Residential Development (PRD)
HEARING EXAMINER:	Mr. Phil Olbrechts, City of Monroe Hearing Examiner
DATE:	July 16, 2019
FILE NUMBERS:	PLPRD2019-01
DESCRIPTION:	Public Hearing for Belmont Terrace Preliminary Plat and Planned Residential Development (PRD) to subdivide approximately 4.75 acres into 19 lots in the Urban Residential (UR9600) zoning district.
APPLICANT:	Matthew J. Hough, PE on the behalf of CPH Consultants 11431 Willows Road NE, Suite 120 Redmond, WA 98052
PROJECT LOCATION:	SEC 36 TWP 28 RGE 06TR 2 OF SNO CO LTS 31-(7-80) REC AF NO 8103090166 BEING A PTN OF NW1/4 NE1/4; otherwise known as 18830 134th Street SE, Monroe, Washington, 98272. Snohomish County Tax Parcel Number(s): 28063600101900.
HEARING DATE:	July 16, 2019 at 3:00 PM
HEARING LOCATION:	Monroe City Hall Council Chambers 806 West Main Street Monroe, WA 98272
STAFF CONTACT:	Anita Marrero, Senior Planner, City of Monroe

A. PROJECT DESCRIPTION

The applicant, CPH Consultants, has submitted an application for preliminary plat and planned residential development (PRD) approval of a 19 lot subdivision/PRD on approximately 4.75 acres (approximately 206,910 square feet). The subject project is zoned Urban Residential (UR9600). The project site is addressed as 18830 134th Street SE, Monroe, WA 98272; and is identified by Snohomish County Tax Parcel Number 28063600101900. The subject site contains a single-family residence. Conceptual street improvements, clearing and grading, and installation of all utilities (sewer, water, storm, power, gas, telephone, cable and telecommunications, etc.) have been reviewed for compliance with the development standards in the applicable sections of the Monroe Municipal Code, as well as other pertinent documents adopted by reference in the code. Frontage improvements, including pavement, curb, gutter, planters, and sidewalks, will be required along internal access roads and along 134th Street SE adjacent to the project site.

B. GENERAL INFORMATION

1. Applicant:
   CPH Consultants
   11431 Willows Road NE, Suite 120
   Redmond, WA 98052

2. Contact Person:
   Matthew J. Hough, PE
   CPH Consultants
   11431 Willows Road NE, Suite 120
   Redmond, WA 98052

3. General Location:
The site is located at SEC 36 TWP 28 RGE 06TR 2 OF SNO CO LTS 31-(7-80) REC AF NO 8103090166 BEING A PTN OF NW1/4 NE1/4; otherwise known as 18830 134th Street SE, Monroe, Washington, 98272. Snohomish County Tax Parcel Number(s): 28063600101900. (Exhibit 2).

4. Site Address:
18830 134th Street SE, Monroe, WA 98272

5. Description of Proposal:
The applicant is requesting preliminary plat and planned residential development approval for a 19 lot subdivision on approximately 4.75 acres in the Urban Residential (UR9600) zoning district with associated grading, drainage improvements, landscaping, and street frontage improvements. The existing single-family residence will be demolished. The proposed development will take access from 134th Street SE.

6. Critical Areas:
The City's critical areas map does not indicate critical areas on the subject site. The applicant submitted a wetland report stating that no wetlands or streams were present on the subject parcel (Exhibit 16).

7. Comprehensive Plan Land Use Designations, Zoning Designations, and Existing Land Uses of the Project Site and Surrounding Area:

AREA	EXISTING LAND USE DESIGNATION	ZONING	EXISTING USE
Project Site	Low Density SFR	Urban Residential (UR9600)	Single-family residential
North of Site	Low Density SFR	Residential 4 Dwelling Units Per Acre (R4)	Single-family residential
South of Site	Low Density SFR	Residential 4 Dwelling Units Per Acre (R4)	Single-family residential
East of Site	Low Density SFR	Residential 4 Dwelling Units Per Acre (R4)	Single-family residential
West of Site	Low Density SFR	Residential 4 Dwelling Units Per Acre (R4)	Single-family residential

8. Public Utilities and Services Provided by:

Water:	City of Monroe	Gas:	Puget Sound Energy
Sewer:	City of Monroe	Cable TV:	Comcast
Garbage:	Republic Services	Police:	City of Monroe
Storm Water:	City of Monroe	Fire:	Snohomish County Fire District No. 7
Telephone:	Verizon	School:	Monroe Public Schools
Electricity:	Snohomish County PUD No. 1	Hospital:	Evergreen Health

C. APPLICATION REVIEW PROCESS

1. Regulatory Requirements for Review of Quasi-Judicial Actions:
Pursuant to Monroe Municipal Code (MMC) Sections 21.20.050(F) and 21.50.120, preliminary plats and planned residential developments are quasi-judicial actions

subject to a public hearing with the Hearing Examiner as the final decision body for the application.

When an applicant seeks a concurrent land use approval for a quasi-judicial action, the City may consolidate all project permit applications for the development proposal so that the review process does not involve more than one open record hearing and one closed record appeal, in accordance with MMC Sections 21.50.120 (Note 3) and 21.50.130. In this case, the applicant has submitted an application for concurrent review of a preliminary plat and planned residential development. The reviews of these applications have been consolidated per MMC 21.30.010 and 21.50.130.

The decision of the Hearing Examiner shall be final and conclusive, unless appealed as provided by law, in accordance with MMC Chapter 21.60. Appeals of final decisions on preliminary plats and preliminary PRD's may be appealed to Snohomish County Superior Court (MMC 21.50.120).

2. Application Submittal and Completeness:
   The Belmont Terrace Preliminary Plat/PRD application was received by the City of Monroe on February 6, 2019 (Exhibit 4). The application was deemed complete and vested on February 25, 2019 (Exhibit 5).

3. Public Notification and Comments:
   Public notice for the application was provided in accordance with the requirements of MMC section 21.40.010. A Notice of Application was published, mailed, and posted on February 27, 2019 (Exhibit 6 - 6E). A public comment period was provided from March 13, 2019 through 5:00 PM on February 7, 2019. No public comments were received and one (1) agency comment from PUD were received. (Exhibit 7A).

   A Notice of Public Hearing was published, mailed, and posted on July 5, 2019 (Exhibit 9 – 9D). The date of the open record public hearing with the Hearing Examiner is set for July 16, 2019 at 3:00 PM. Public testimony may be provided during the public hearing pursuant to MMC 21.50.060(C).

4. Environmental Review:
   A Determination of Non-Significance (DNS) was issued on May 10, 2019 (Exhibit 8). The DNS provided a comment and appeal period ending at 5:00 PM on May 24, 2019. No appeals regarding the SEPA threshold determination were received by the City during the specified appeal period.

D. FINDINGS OF FACT

1. Application Submittal and Completeness:
   The application was submitted on February 6, 2019 and determined to be complete on February 25, 2019.

2. Environmental Review:
   A SEPA Determination of Non-Significance (DNS) was issued on May 10, 2019. No comments or appeals on the SEPA threshold determination were received.

3. Bulk Requirements and Dimensional Standards:
   Per MMC section 18.10.050 Zoning Land Use Matrix, and MMC section 18.10.140 Bulk Requirements and Table A, the development shall comply with the following standards for the Urban Residential (UR9600) zone for single family residential development:

Excerpt of MMC 18.10.140 – Table A *Residential Zoning District Bulk Development Requirements for PRDs in UR9600 Zoning*	
Bulk Requirement	**Standard for PRDs**
Maximum density	3.63 dwelling units per acre
Minimum lot width	30 feet
Minimum front yard setback	10 feet to the living area/20 feet from the garage
Minimum side yard setback	5 feet
Minimum rear yard setback	10 feet
Maximum building height	35 feet
Maximum lot coverage	60%
Landscape buffer	10 feet*

** A landscape buffer is required along the outside of the development where it abuts a standard subdivision or different zoning district [MMC 18.10.140(Table A - Note 15)].*

4. Density Calculations and Allowance:
   Sections 18.10.010(B), 18.84.080(K), 18.84.140, and 18.84.160(A) of the MMC delineate how an applicant can determine the maximum allowed residential density for a PRD.

   To calculate the maximum allowed base density for a site in the UR9600 zone, multiply the gross site area, in acres, by 3.63. The base density for the Belmont Terrace site, with a gross site area of 4.75 acres, would be calculated as follows.

   Step 1. Gross site area (in acres) * 3.63 (3.63 dwelling units per acre in the UR9600 zone):

   *4.75 acres * 3.63 = 17.24 dwelling units (base density)*

   Regulations governing the application of a density bonus to a PRD can be found in MMC 18.84.080(K)(2-4), MMC 18.84.150, and MMC 18.84.160(C). With the inclusion in a PRD of the required amount of open space specified in MMC 18.84.080(A)(1)(Table 1), a thirty percent density bonus will be granted in the UR9600 zone. Determining the density bonus in the UR9600 zone entails multiplying the base density calculated above by 0.30 to determine the total number of bonus units allowed for the PRD. The density bonus for the subject site would be assessed as follows.

   Step 2. Base density * 0.30 (30 percent density bonus allowance for the R4 zone):

   *17.24 dwelling units (base density) * 0.30 = 5.17 units (density bonus)*

   Step 3. Density bonus + Base density = Maximum units for the PRD:

   17.24 units + 5.17 units = 22.41 units

   Step 4. MMC 18.10.010(B)(1) requires that "when calculating the maximum residential density, any resulting fraction 0.50 or over shall be rounded up to the next whole number and any fraction 0.49 or under shall be rounded down to the preceding whole number:"

   *A maximum of **22 units** are allowed in the Belmont Terrace preliminary plat/PRD.*

The applicant is proposing 19 dwelling units, which is within the maximum density allowed in the UR9600 zoning district. Thus, the density is consistent with that allowed by the zoning code.

5. MMC Title 17 Subdivision(s):
   Pursuant to MMC 17.12.030(E), the City Planner, City Engineer, Fire Marshal, and Building Official have all reviewed and commented on the proposed project. Their comments are included in the body of this report and in the project permit conditions of approval.

6. MMC Title 17 Preliminary Plat Decision Criteria:
   Pursuant to MMC 17.12.030(H)(1-3) the applicant shall comply with the following:

   The hearing authority shall consider if the proposed subdivision conforms to the comprehensive plan and the Shoreline Master Program;

   The City of Monroe's 2015-2035 Comprehensive Plan Future Land Use Map designates the project site as "Low Density SFR." The proposed preliminary plat and PRD, under UR9600 zoning, which provides for 3.63 dwelling units per acre, conforms to the City of Monroe's 2015-2035 Comprehensive Plan "Low Density SFR" designation for density. The City of Monroe 2015-2035 Comprehensive Plan Table 3.07 provides the following description of the "Low Density SFR" land use plan designation:

   > *Low Density SFR*
   > *The Low Density Single-Family Residential designation will develop at an approximate gross density of three to five units per acre. This is a gross density, applying this density to every acre within the designation regardless of physical constraint. By using a gross density – and not one tied specifically to a particular lot size – developers can explore clustering or other creative design approaches when their sites include constraints imposed by critical areas, easements or rights of way. In cases where land is relatively free of constraint, single-family subdivisions in this designation may have individual lots ranging from about 9,000 square feet to 14,500 square feet. In highly constrained areas individual lots may be smaller. The Low Density SFR designation allows for parks. The Low Density SFR designation allows for neighborhood scale retail and commercial developments along arterials.*

   The site is not located within the shoreline jurisdiction for the City. Therefore, this provision does not apply.

   The hearing authority shall consider the physical characteristics of a proposed subdivision site and may recommend disapproval of a proposed plat because of improper protection from floods, inundation or wetland conditions;

   The site is not located within a floodplain. As described above, there are no wetlands on site. This provision does not apply.

   All identified direct impacts must be mitigated or meet concurrency as set forth in MMC Title 20.

All direct impacts of the proposal have been or will be mitigated through municipal code requirements and the conditions of preliminary plat approval.

Per MMC section 20.06.030(D), strategies and financial commitments are in place to complete necessary improvements or strategies within six years of time of development as set forth in the Comprehensive Plan. This includes the payment of mitigation and/or impact fees for water, wastewater, parks, transportation, and schools. Stormwater is mitigated on site by the applicant during subdivision improvement construction. The City of Monroe Police Department and Fire District #7 did not raise any concerns regarding level of service standards when provided the opportunity to comment on the proposed preliminary plat.

According to the information presented in the development application as well as the analysis completed by City staff, the development does not lower the level of service on the following public facilities and services below the minimum standards established within the City of Monroe Comprehensive Plan:

a. Potable water;
b. Wastewater;
c. Storm water drainage;
d. Police and fire protection;
e. Parks and recreation;
f. Arterial roadways; and
g. Public schools.

7. RCW 58.17.110 - Approval or disapproval of subdivision and dedication-factors to be considered-Conditions of approval-Finding-Release from damages:

1) The city, town, or county legislative body shall inquire into the public use and interest proposed to be served by the establishment of the subdivision and dedication. It shall determine:

(a) If appropriate provisions are made for, but not limited to, the public health, safety, and general welfare, for open spaces, drainage ways, streets or roads, alleys, other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds, and shall consider all other relevant facts, including sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school; and

The preliminary plat map (Exhibit 3) confirms that the preliminary plat/PRD application includes provisions for the public health, safety, and general welfare including open spaces, drainage ways, streets or roads, potable water, sanitary wastes, parks and recreation, playgrounds, schools and school grounds, and sidewalks that assure safe walking conditions for students who only walk to and from school. The Monroe School District was notified of the development application. No comments were received from the Monroe School District on the proposal.

(b) Whether the public interest will be served by the subdivision and dedication.

The public interest would be served by the subdivision and dedication, provided that the subdivision and dedication were developed under the

current zoning district (UR9600). Under this scenario, an existing parcel in the City would be developed allowing for efficient provision of public services, consistent with densities identified in the Monroe 2015-2035 Comprehensive Plan.

(2) A proposed subdivision and dedication shall not be approved unless the city, town, or county legislative body makes written findings that:

(a) Appropriate provisions are made for the public health, safety, and general welfare and for such open spaces, drainage ways, streets or roads, alleys, other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds and all other relevant facts, including sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school; and

The proposal does not adversely change the preliminary plat's/PRD provisions for the public health. The conditions of the approved preliminary plat/PRD address safety, and general welfare, including open spaces, drainage ways, streets or roads, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds, and sidewalks that assure safe walking conditions for students who walk to and from school.

(b) The public use and interest will be served by the platting of such subdivision and dedication. If it finds that the proposed subdivision and dedication make such appropriate provisions and that the public use and interest will be served, then the legislative body shall approve the proposed subdivision and dedication. Dedication of land to any public body, provision of public improvements to serve the subdivision, and/or impact fees imposed under RCW 82.02.050 through 82.02.090 may be required as a condition of subdivision approval. Dedications shall be clearly shown on the final plat. No dedication, provision of public improvements, or impact fees imposed under RCW 82.02.050 through 82.02.090 shall be allowed that constitutes an unconstitutional taking of private property. The legislative body shall not as a condition to the approval of any subdivision require a release from damages to be procured from other property owners.

Areas designated for dedication to the City of Monroe are clearly shown on the face of the plat and are noted in the conditions of preliminary plat approval. Furthermore, said dedications shall be included on the face of the final plat. The subject proposal does not include dedication of a public park. Private recreation space has been provided in Tract A. Required site improvements and impact fees will be required as conditions of plat approval. The Washington State Growth Management Act requires that jurisdictions that plan shall have sufficient housing capacity to meet projected growth targets. The proposed plat/PRD increases the residential density of the City by creating lots to accommodate future population growth, which increases the City's housing capacity.

8. MMC Title 18 Planned Residential Development Decision Criteria:
The applicant has applied for a preliminary PRD as part of the preliminary plat application. PRDs are intended to promote creativity in site layout and design, allowing flexibility in the application of the standards for residential development to protect and enhance environmental features, and provide other public benefits. As part of the proposed preliminary plat/PRD the applicant is proposing landscaping and additional open space and park improvements.

Per MMC section 18.84.080, the applicant must meet the general requirements for a PRD. These criteria, followed by a staff response, are provided below:

a) The inclusion of housing site standards as described in subsection (G) of this section.

At present, final housing elevations have not been provided to the City. However, the approval of the preliminary plat and PRD does not lock the applicant into typical elevations; rather the applicant shall provide housing elevations/facades review in accordance with the above subsection at the time of building permit application.

b) The inclusion of street and site design standards as described in subsection (H) of this section.

The applicant is providing public streets which will be fully paved with sidewalks, planter strips, and curb and gutter. The applicant is also required to install frontage improvements along 134th Street SE.

c) The inclusion of park recreational usable open space and landscaping as described in subsection (I) of this section.

Pursuant to MMC 18.84.080(A)(1), a PRD located within the UR9600 zone must dedicate a minimum area of 975 square feet of usable park and recreational open space per base dwelling unit. The applicant is requesting to subdivide the subject site into 19 single-family residential lots, Based on the 17 allowed base units, a minimum useable open space dedication of 16,575 square feet is required (.38 acres). Within Tract A, the applicant is providing a total open space gross area of 23,498 square feet (.54 acres). Therefore, the proposal exceeds the minimum required dedication of 975 square feet per base unit. Pursuant to MMC 18.84.080(I)(2), "All park and recreational usable open space shall be three-fourths acre or larger unless the overall size of the PRD precludes this requirement. If there is less than three-fourths acre of park and recreational usable open space, then all of that amount shall be used for a single park and recreational usable open space." The minimum area of usable park and recreational space is less than three-fourths an acre.

As discussed above, the proposed subdivision provides one private neighborhood park within the development. Tract A (23,498 sq. ft.) will contain a concrete walk, a play structure, and bench (Exhibit 10). Maintenance of the park and recreation tracts, shall be the responsibility of the homeowner's association.

d) The inclusion of landscape design standards as described in subsection (J) of this section.

The project proposes additional landscaping within park open space Tract A and

Tract B. The project also includes street trees located within five-foot landscape strips along the new interior public streets and adjacent to the south of 134th Street SE. A 10-foot wide landscaping buffer is provided adjacent to the south site boundaries per MMC 18.10.140.

MMC section 18.84.120 states that a Preliminary Development Plan shall be approved if the plan meets the following criteria:

a) The PRD is in accordance with the comprehensive plan; and

A PRD developed under the UR9600 zoning district development standards is consistent with the City of Monroe 2015-2035 Comprehensive Plan Low Density SFR land use designation.

b) The PRD accomplishes a development that is better than that resulting from traditional development and provides a net benefit to the city. A net benefit to the city may be demonstrated by the following:

a. Conservation of natural features and sensitive area
b. Placement, style or design of structures
c. Recreational facilities
d. Interconnected usable open space
e. Provision of other public facilities
f. Aesthetic features and harmonious design
g. Energy-efficient site design and/or building features

The overall development meets the City's goals of conservation of natural areas and provision of recreational facilities. The usable open space is interconnected and provides direct access to a pedestrian corridor and is within walking distance to each housing unit.

The placement, style or design of structures, aesthetic features, harmonious design, and energy-efficient site design and/or building features will be addressed during building permit review. The PRD is required to adhere to housing standards that require the mixing of housing styles to eliminate repetition in block/street frontage and housing design. Site design standards are met by providing cluster mailboxes, providing onsite parking, minimizing exterior lighting, and providing landscaping to screen undesirable elements.

The PRD is required to meet provisions required by PUD for development and is a condition of approval.

c) The PRD will be served by adequate public facilities including streets, fire protection, water, storm water drainage, and sanitary sewer for acceptable waste controls as demonstrated by the submittal and review of plans for such facilities as described under MMC 18.84.060.

The site will be served by adequate public facilities including streets, water, sewer, fire protection, and stormwater drainage facilities.

d) The proposed landscaping within the PRD's perimeter is superior to that normally required by the city.

Along with the required 10' landscape buffer and open space requirement, the development is providing a landscaping tract consisting of 3,301 square feet of landscaped area. The open space area is 6,923 square feet over the open space requirement thus providing superior landscaping throughout the development.

e) At least one major circulation point is functionally connected to a public right-of-way.

The development will have direct access off of 134th Street SE. An internal public access road will be constructed to service the development and will be aligned to the development to the north of the project site.

f) The open space within the PRD is integrated into the design of the project rather than an isolated element.

The open space tract and private park provided in Tract A is integrated into the design of the project and not isolated.

g) The PRD is compatible with the adjacent development.

The PRD is compatible with adjacent development to the north and west of the project site.

h) Undeveloped land adjoining the PRD may be developed in coordination with the PRD.

N/A

i) The PRD is harmonious and appropriate in design, character, and appearance to the existing or intended character of development in the immediate vicinity.

The PRD is consistent with single-family development and is appropriate in design, character, and appearance to other SFR development in the immediate vicinity.

j) Roads, streets and sidewalks, existing and proposed, comply with the standards and requirements of this chapter and the Monroe Municipal Code.

The development is providing public streets which will be fully paved with sidewalks, planter strips, and curb and gutter. The applicant is also required to install frontage improvements along 134th Street SE.

k) Each phase of the PRD, as it is completed, shall contain the required parking spaces, open space, recreation facilities, landscaping, and utility area planned for that phase.

Parking space requirements will be reviewed at the building permit application stage. Each single-family residence is required to provide two (2) onsite parking spaces. The PRD will be constructed in one phase and will include an open space/recreation tract, landscaping to include perimeter landscaping and street trees, and all utilities have been shown on the preliminary utility plan.

9. Critical Areas:

   There are no known critical areas on this site.

10. Utilities:

    There is sufficient capacity available in the City's public water and sanitary sewer system to serve the proposed subdivision. All lots will connect to the City's water and sewer system. Sanitary sewer and water lines will be constructed in the proposed public rights-of-way in accordance with the current City's Public Works Design and Construction Standards. The conceptual utilities plan is attached (Exhibit 11).

    As part of the civil plan review process, the applicant will install improvements to the stormwater system. Stormwater management will be designed to meet the requirements of the 2014 Department of Ecology Storm Water Management Manual for Western Washington as administered by the City Engineer. Any future permitted

activities, such as building permits, will also have to comply with the provisions of the Storm Water Management Manual in effect at the time of the vesting of the permit application.

11. Streets and Traffic:

Access to the subdivision is proposed via 134th Street SE. Internal access to individual lots will be provided through public roads. The new plat road will extend south and align with 189th Avenue SE to the north. Three private access tracts area also proposed to serve some of the perimeter lots from the public Local Access street (189th Avenue SE). The proposed public roads will comply with the City's Public Works and Design Construction Standards. The proponent has submitted a deviation request (Exhibit 15) for a modified roadway section from the City of Monroe Public Works Design and Development Standards (PWDDS) standard drawing 303A for the on-site private roads (PAT1, PAT2, and PAT3).

The proponent shall dedicate right-of-way for streets as shown on the proposed preliminary plat map. Frontage improvements, including curb, gutter, sidewalk and street trees shall be provided for all streets within the subdivision. Frontage improvements along 134th Street SE includes curb and gutter, a landscape strip with street trees, and a five (5) foot wide sidewalk along the entire length of the property frontage. Traffic control devices and street signs shall be installed prior to final plat approval, and all private roads within the subdivision shall be constructed in accordance with the City's Public Works Design and Construction Standards and installed by the developer to the satisfaction of the City Engineer prior to final plat approval.

Based on the Traffic Impact Analysis dated November 2018 (Exhibit 14), the development is anticipated to generate approximately 13.32 AM peak-hour trips and 17.82 PM peak-hour trips. The level of service analysis shows that all of the study intersections in the TIA are anticipated to operate within acceptable level of service thresholds.

Impacts to the City's transportation system are mitigated through the collection of traffic mitigation fees. In accordance with the City's traffic impact fee program under MMC Chapter 20.12, impact fees require a standard fee amount per dwelling unit as a condition of residential development within the City. Traffic impact fees shall be paid in accordance with MMC Chapter 20.12 and shall be based on the amount in effect at the time of payment. Frontage improvements and paving, including curb, gutter, sidewalk, and street trees shall be installed along all private streets within the subdivision in accordance with the City's Public Works Design and Construction Standards.

12. Park and Recreation Usable Open Space:

The proposed subdivision provides one private neighborhood park within the development. Tract A (23,498 square feet) will contain a concrete walk, a play structure, and bench (Exhibit 10). Maintenance of the park and open space tract, shall be the responsibility of the homeowner's association.

Impacts to the City park and recreation system from the anticipated additional public park users will be mitigated. In accordance with the City's park impact mitigation fees established under MMC Chapter 20.10, impact fees require a standard fee amount per dwelling unit as a condition of residential development within the city. Park impact fees shall be paid in accordance with MMC 20.10. Park impact fees shall be based on the fee amount in effect at the time of payment.

13. Schools:
    Impacts to the Monroe Public Schools and the Snohomish School District in the form of additional students are addressed through mitigation programs. The City of Monroe has adopted the Monroe and Snohomish School District 2016 - 2021 Capital Facilities Plan, and imposes impact fees for schools in accordance with the plan and MMC Chapter 20.07. School mitigation fees require a standard fee amount per dwelling unit as a condition of residential development within the city. School impact fees are based on the amount in effect at the time of payment.

    RCW 58.17.110(2) requires the City to make a finding that the proposed subdivision assures "safe walking conditions for students who only walk to and from school." Students will be bussed from the development to Park Place Middle School and Monroe High School by the Monroe School District. Most grade school students will be bussed to Chain Lake Elementary School. The public streets created within the subdivision generally include sidewalks on all sides of the street where residential lots front public roadways as well as a sidewalk along the property frontage adjacent to the north of 134th Street SE.

14. Impact Fees and Capital Improvements:
    Development shall be subject to all applicable MMC requirements specifically including and without limitations, all applicable impact fees, and capital improvement charges pursuant to MMC section or chapter 13.04.025, 13.08.272, 20.07, 20.10, and 20.12.

15. Preliminary Plat Expiration:
    Per MMC section 17.12.020(A), preliminary approval of a proposed plat shall be effective for a period not to exceed five years from the date of Hearing Examiner approval, or concurrently with the expiration of the preliminary plat, whichever occurs earlier.

E. CONCLUSIONS OF LAW

1. The City of Monroe 2015-2035 Comprehensive Plan Future Plan Map designation for the site is "Low Density SFR," which assumes an overall density of three to five units per acre. The site's present zoning designation of Urban Residential (UR9600) is in compliance with the future land use designation adopted in the current Comprehensive Plan.

2. The proposed subdivision and PRD, as conditioned herein, will be consistent with the pertinent development goals and policies outlined in the Monroe 2015-2035 Comprehensive Plan.

3. The proposed subdivision and PRD, as conditioned herein, will be consistent with the applicable land division requirements outlined in MMC Title 17, Subdivisions.

4. The proposed subdivision and PRD, as conditioned herein, will be consistent with the pertinent development standards outlined in MMC Title 18, Planning and Zoning.

5. The proposed subdivision and PRD, as conditioned herein, will make appropriate provisions for public use and interest, health, safety, and general welfare.

6. The proposed preliminary plat and PRD as conditioned meets all MMC requirements for a subdivision and PRD.

7. The preliminary plat and PRD should be approved subject to the conditions noted below.

8. The preliminary plat approval shall expire five years from the date of Hearing Examiner approval.

F. STAFF RECOMMENDATION

Based on the Findings of Fact and Conclusions of Law detailed in the staff report, staff recommends that the Hearing Examiner **APPROVE** the Belmont Terrace Preliminary Plat/PRD (project number PLPRD2019-01), subject to the following conditions of preliminary approval:

1. All improvements shall be constructed in accordance with the approved preliminary plat map with the date stamp of May 14, 2019. Minor modifications of the plans submitted, as described in MMC 18.84.210 (e.g. BLA or reduction in total number of lots), may be approved by the Community Development Director or his/her designee if the modifications do not change the Findings of Fact or the Conditions of Approval.

2. Final engineering drawings depicting the street improvements, water and sewer improvements, and drainage design shall be submitted to the City's Public Works Director for final review and approval before issuance of any grading permits. The street, water and sewer, and drainage improvements shall be designed in accordance with the City's most current Public Works Design and Construction Standards.

3. The project shall implement all of the applicable recommendations contained in the following technical reports submitted to the City:
    a) Stormwater Drainage Report, prepared by CPH Consultants, dated May 13, 2019 (Exhibit 12).
    b) Geotechnical Report, prepared by Terra Associates, Inc., dated December 4, 2018 (Exhibit 13).
    c) Traffic Report, prepared by GTC, dated November 2018 (Exhibit 14).

CLEARING AND GRADING

4. A comprehensive erosion and sedimentation control plan to ensure appropriate on-site and off-site water quality control shall be developed and implemented for all construction activities. The Best Management Practices outlined in the 2014 DOE Stormwater Management Manual for Western Washington shall be incorporated into the design. At a minimum, the plan shall include the following elements:

    a) Exposed soils shall be stabilized and protected with straw, hydro-seeding or other appropriate materials to limit the extent and duration of exposure;

    b) Disturbed areas shall be protected from storm water runoff impacts through the use of silt fence. Other means of filtration of storm water runoff and for limiting erosion/sedimentation such as check dams, and sediment traps may be required and are recommended.

    c) Clearing and grading activities shall not be performed in the winter-wet season when soils are unstable.

STORM DRAINAGE IMPROVEMENTS

5. The stormwater system design and stormwater discharge shall utilize the Best Management Practices of the 2014 DOE Stormwater Management Manual for Western Washington.

6. Stormwater pollution prevention measures shall be employed per the approved Stormwater Pollution Prevention Plan and as necessary to ensure appropriate on-site and off-site water quality control. Site runoff during construction shall be handled and treated as to quantity and quality impacts by utilizing Best Management Practices, as defined in the 2014 DOE Stormwater Management Manual for Western Washington.

7. The developer shall obtain a General Construction Stormwater NPDES Permit from the WA Department of Ecology (DOE) prior to beginning construction.

ROAD IMPROVEMENTS

8. Frontage improvements, including curb, gutter, sidewalk, street trees, and traffic control devices shall be provided for all streets within the subdivision; shall be constructed in accordance with the City's most current Public Works Design and Construction Standards; and are to be installed by the developer to the satisfaction of the City Engineer prior to final plat application.

UTILITIES

9. New service for this project shall be from the west. Existing PUD facilities may need relocations or modifications at the developer's expense. Any relocation, alteration or removal of District facilities to accommodate this project shall be at the expense of the project developer, and must be coordinated with the PUD in advance of final design. Cost of any work, new or upgrade, to existing facilities that is required to connect this proposed development to the District electric system shall be in accordance with the applicable District policy. The developer will be required to supply the District with suitable locations/easements upon its property for any electrical facilities that must be installed to serve the proposed development.

LANDSCAPING

10. A final landscape plan shall be submitted to the City. No clearing, grading, or building permit shall be issued before the submittal and approval of this final plan. Street trees shall be planted when a street frontage is fully owner occupied and as directed by the City of Monroe Planning Department. The City will coordinate tree plantings to the most favorable time of the year for plant survival. All street frontage landscaping/irrigation improvements shall be bonded until such time that housing construction is completed and bonded work may be completed without risk of construction damage.

11. Irrigation is required for all street trees and newly planted vegetation within the right-of-way and within Tracts (where applicable and required by the City). The applicant shall submit an irrigation plan prior to construction for review and approval by the City.

FIRE

12. The following requirements shall be adhered to during construction and completed before occupancy of any structure in accordance with the 2015 International Fire Code:

    - Fire hydrants shall be provided in accordance with city standards and the direction of the Fire Marshal
    - Fire Hydrants shall be installed as per fire flow and spacing requirements specified for the type of development with regards to distances to structures;
    - Fire hydrants shall be equipped with four (4) inch quarter-turn Storz adapters;
    - An access route, for fire fighting apparatus, must be provided at the start of construction. Minimum access route requirements include a 20' width, 13'6" vertical height clearance, and the ability to support a load up to 75,000 pounds;

- All buildings must be addressed visibly and legibly from the road. When buildings are not visible from the street, appropriate provisions must be made to identify clearly which road or drive serves the appropriate address including private roads.

FEES

13. Prior to approval of the final plat, all landscaping associated with the plat shall require the submittal of an acceptable warranty surety to warrant all required landscaping improvements against defects in labor materials for a period of 24 months after acceptance of those improvements by the City. The warranty amount shall be equal to fifteen (15) percent of the costs of the improvements, as determined by the Community Development Director.
14. Prior to approval of the final plat, the developer shall submit an acceptable warranty surety to warrant all required public improvements, installed, against defects in labor and materials for a period of 24 months after acceptance of those improvements by the City. The warranty amount shall be equal to ten (10) percent of the costs of the improvements, as determined by the Public Works Director. The surety shall be submitted to and approved by the City of Monroe and executed prior to final plat approval.
15. Park, Traffic and School impact fees assessed in accordance with MMC Chapters 20.07, 20.10 and 20.12 shall be required and paid at the rate in effect at the time of building permit issuance.
16. The water system capital improvement charge, in accordance with MMC Section 13.04.025, shall be required and paid prior to building permit issuance.
17. The wastewater system capital improvement charge, in accordance with MMC Section 13.08.270, shall be required and paid prior to building permit issuance.

FINAL PLAT

18. Prior to Final Plat submittal, all improvements shall be installed, inspected, and approved by the City Engineer per the approved plans. All improvements shall be constructed in accordance with the approved engineering plans and preliminary plat map. Minor modifications of the plans submitted may be approved by the Community Development Director or Public Works Director if the modifications do not change the Preliminary Plat Findings of Fact or Conditions of Approval.
19. All lot corners shall be installed with rod and cap or other City-approved survey method prior to Final Plat approval.
20. All existing and proposed easements and maintenance agreements shall be clearly shown and labeled on the final plat.
21. The following note shall appear on the face of the Final Plat Map: “The Homeowners Association is responsible for maintaining, in a uniform manner, all landscaping and irrigation within all commonly owned Tracts and easements.”
22. The following Waiver of Claims for Damages Statement shall appear on the face of the Final Plat Map: “This dedication includes conveyance of roads, tracts, utility and storm drainage infrastructure, and other areas of right-of-way intended for public use and/or ownership as shown on or otherwise referenced by the plat. The [insert name here] hereby waives all claims against the City of Monroe and/or any other governmental authority for damages which may occur to the adjacent land as a result of the construction, drainage and maintenance of such facilities and improvements.”
23. If the final plat contains dedication of land for public purposes, it shall contain the following statement:

"Know all men by these presents that (name of developer) do hereby declare this plat and dedicate to the public forever all roads and ways and other public property shown hereon, and the use thereof for any and all public purposes, with the right to make all necessary slopes for cuts and fills, and the right to continue to drain the roads and ways over and across any lot or lots, where water might take a natural course, in the original reasonable grading of the roads and ways shown hereon.

Following original reasonable grading of roads and ways hereon, no drainage waters on any lot or lots shall be diverted or blocked from their natural course so as to discharge upon any public road rights-of-way, or to hamper proper road drainage. Any enclosing of drainage waters in culverts or drains or rerouting thereof across any lot as may be undertaken by or for the owner of such lot shall be done by and at the expense of such owner, but only after approval by the city engineer."

24. The following shall be shown on the recording block section of the plat map: "Refer to Auditor Recording Number."

25. The final plat shall provide space for the approving signatures of the community development director, city engineer and the mayor, and the city clerk shall attest the signatures.

26. The title block on the final plat map shall have the names of all the legal owners of the property named on the plat and the name of the surveyor/engineering firm which prepared the final plat map.

27. An Auditor's Certificate shall be shown on the final plat map.

28. The following are required to be shown on the face of the final plat map:

- Surveyor Certificate;
- Correct legal description of all lots as set out in Chapter 58.17 RCW;
- Owners Statement;
- All new easement(s) over the property, their legal description(s) and associated dedication block(s);
- Recording block/Certification blocks for City approval;
- North arrow;
- Certification of Payment of Taxes and Assessments;
- Auditor's Certificate; and
- The survey control scheme, monumentation, basis of bearing and references.

MISCELLANEOUS

29. Preliminary plat approval shall be effective for a maximum time period of five years upon which a final plat that meets all conditions of the preliminary plat approval must be submitted, in accordance with MMC 17.12.020(A).

30. The developer shall apply to the Snohomish County Auditor at 3000 Rockefeller Avenue, Everett, WA 98201-4060 for a plat name reservation certificate and furnish the City with a copy of the approved reservation certificate at the time of final plat submittal.

31. If applicable, at the time of final plat submittal the developer shall submit a group mailbox plan, approved by the U.S. Post Office, to the Planning Department for final addressing.

32. Mail routes, including mailbox types and locations, shall be approved by the Postmaster prior to construction.

33. The developer shall submit a paper copy of the final plat to the Snohomish County Assessor's at 3000 Rockefeller Avenue, Everett, WA 98201-4060 with a segregation letter for land segregation and property tax review.

34. All construction equipment, building materials, and debris shall be stored on the applicant's property, out of the public right-of-way. In no case shall the access to any private or public property be blocked or impinged upon without prior consent from the affected property owners and the City of Monroe.

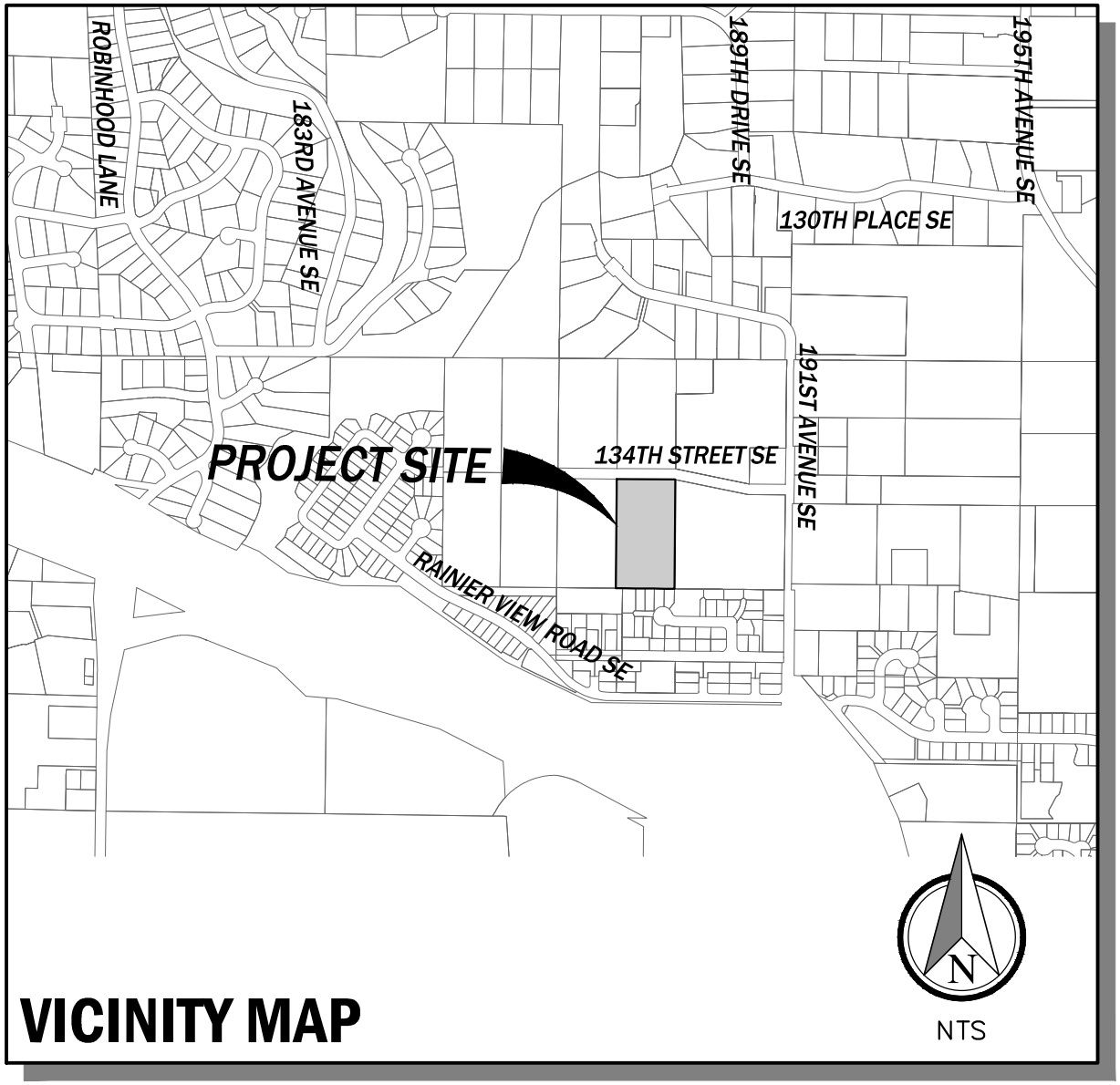
35. If at any time during clearing, grading and construction the streets are not kept clean and clear, all work will stop until the streets are cleaned and maintained in a manner acceptable to the Public Works Director.

36. Construction noise is not allowed between the hours of eight (8) p.m. and seven (7) a.m. Monday through Friday, and between the hours of eight (8) p.m. and nine (9) a.m., Saturday, Sunday, and legal holidays.

37. All signs shown on the approved plans for the subdivision are for illustrative purposes only. Pursuant to Monroe Municipal Code 18.80, a sign permit must be obtained for the placement of any non-exempt signage. Application for that sign permit shall include an approved site plan specifying the location of all signs.

38. The developer and contractor shall attend a pre-construction meeting with City staff to discuss expectations and limitations of the project permit before starting construction.

BELMONT TERRACE PRELIMINARY PLAT/PRD



PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.

PROJECT INFORMATION

GENERAL	
PARCEL NO.:	28063600101900
SITE ADDRESS:	18830 134TH ST SE MONROE, WA 98272-9753
EXISTING ZONING:	UR9600
SITE DEVELOPMENT	
TOTAL SITE AREA	4.75 AC
TOTAL DEVELOPABLE AREA	4.75 AC
UNDISTURBED AREA	0.00 AC
IMPERVIOUS AREAS:	
BUILDINGS AND DRIVEWAYS	1.45 AC
ROADWAY AND SIDEWALKS	2.31 AC
POND SURFACE	0.41 AC
PERVIOUS AREAS:	
PLANTER STRIP LANDSCAPING	0.07 AC
PARK AND YARD LANDSCAPING	1.96 AC
ALLOWABLE RESIDENTIAL DENSITY:	
ALLOWABLE BASE DENISTY	4.75 AC x 3.63 DU/AC = 17 LOTS
PRD DENSITY BONUS	0.30 x 17 = 5 LOTS
TOTAL ALLOWABLE UNITS	22 LOTS
PROPOSED NO. LOTS	19 LOTS
MINIMUM LOT SIZE	4,562 SF
MINIMUM LOT WIDTH	45 FT
MAX LOT COVERAGE	60%
RESIDENTIAL LOT MIX (MMC 18.84.080.O)	0% ≤ 4,000 SF 21% 4,001 TO 5,000 SF 79% > 5,000 SF
BUILDING SETBACKS	10 FT - FRONT 20 FT - GARAGE 10 FT - REAR 5 FT - SIDE
PARK AND RECREATION OPEN SPACE	
MINIMUM REQUIRED (975 SF/LOT x BASE DENSITY):	975 x 17 = 16,575 SF
PARK AND RECREATION OPEN SPACE PROVIDED:	
TRACT A	23,498 SF
TOTAL	23,498 SF

UTILITY PURVEYORS

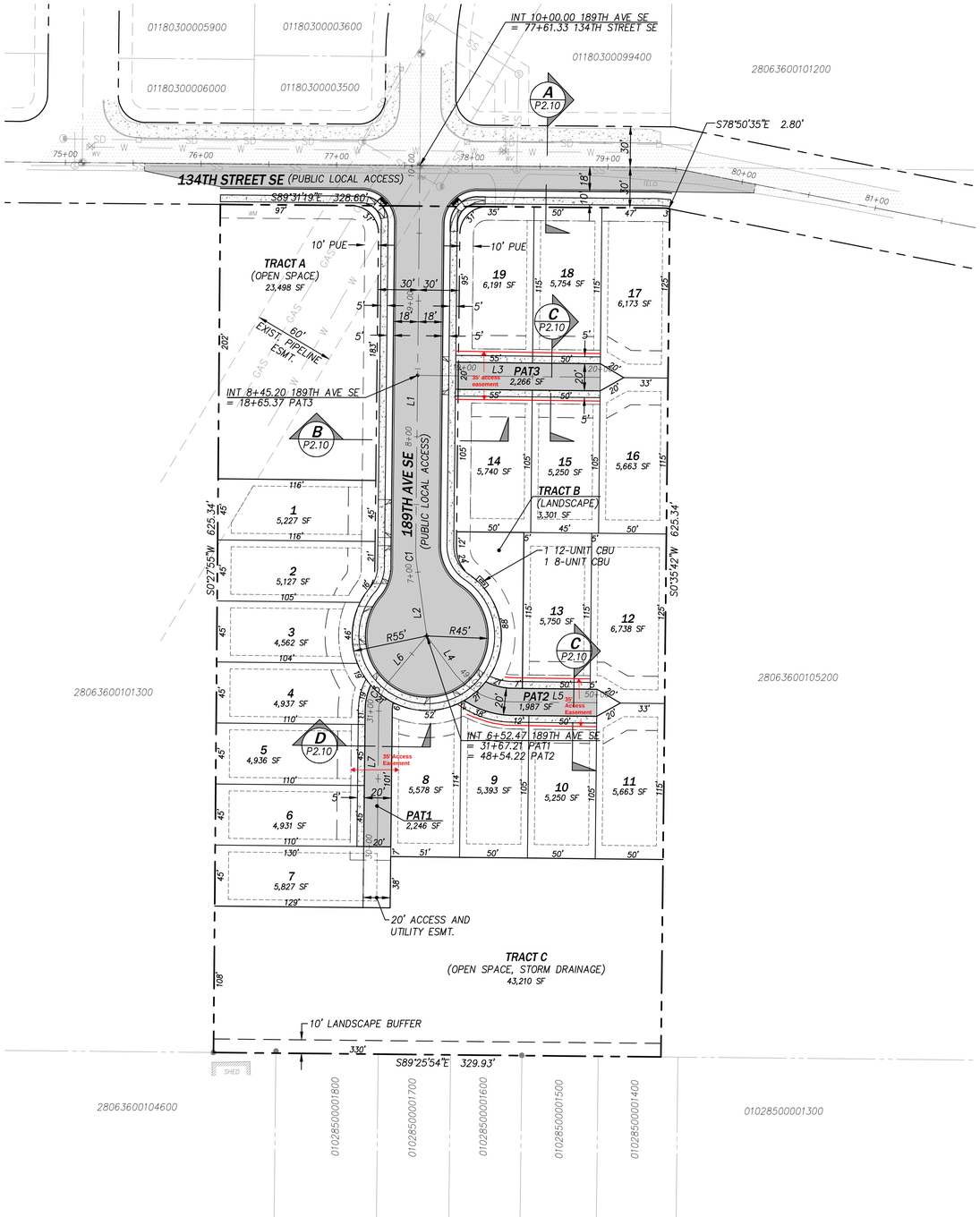
WATER	CITY OF MONROE
SANITARY SEWER	CITY OF MONROE
STORM DRAINAGE	CITY OF MONROE
FIRE DISTRICT	SNOHOMISH COUNTY FIRE DISTRICT NO. 7
SCHOOL DISTRICT	MONROE SCHOOL DISTRICT NO. 103
POWER	SNOHOMISH CO. PUD
NATURAL GAS	PUGET SOUND ENERGY
EXIST. GAS TRANSMISSION LINE	WILLIAMS - NORTHWEST PIPELINE

ROADWAY ALIGNMENT AND TRACT DATA

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	284.18'	N0°37'18"E
L2	125.41'	N7°57'29"W
L3	180.00'	S89°22'42"E
L4	57.70'	S36°27'59"E
L5	111.57'	S89°22'42"E
L6	67.48'	N39°56'19"E
L7	125.72'	N0°37'18"E

CURVE TABLE			
CURVE #	Δ	RADIUS	LENGTH
C1	N3°40'06"W	53.00'	7.94'
C2	S62°55'20"E	55.00'	50.79'
C3	N20°16'49"E	35.00'	24.02'

NOTE:
EACH PRIVATE ACCESS TRACT SHALL BE DESIGNATED AS A FIRE LANE AND INCLUDE APPROPRIATE SIGNAGE.



SURVEY DATA

EXISTING BOUNDARY, TOPOGRAPHIC, AND PLANIMETRIC INFORMATION SHOWN ON THIS PLAN AND OTHERS IN THIS SET WERE USED AS A BASIS FOR DESIGN AND REPRESENT FIELD SURVEY DATA AND MAPPING PREPARED BY LDC, AS PROVIDED BY THE PROJECT OWNER, AND DOES NOT REPRESENT WORK BY CPH CONSULTANTS. THE FOLLOWING SURVEY DATA WAS PROVIDED WITH THE TOPOGRAPHIC MAP BY LDC:

LEGAL DESCRIPTION
CHICAGO TITLE INSURANCE COMPANY
COMMITMENT NO. 500076500
COMMITMENT DATE: SEPTEMBER 14, 2018 AT 08:00 AM

TRACT 2 OF SNOHOMISH COUNTY LARGE TRACT SEGREGATION 31(7-80) RECORDED UNDER AUDITOR'S FILE NO. 8103090166, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, BEING A PORTION OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 36, TOWNSHIP 28 NORTH, RANGE 6 EAST OF THE WILLAMETTE MERIDIAN.

SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

VERTICAL DATUM

NORTH AMERICAN VERTICAL DATUM–1988

HORIZONTAL DATUM

NAD 83/91
WASHINGTON STATE COORDINATES–NORTH ZONE

BASIS OF BEARING

NAD83/91 FROM GPS OBSERVATION
MONUMENTED NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 36 AS SHOWN HEREON (BEARING = N 89°36'44" W)

SITE TBM

PROJECT BENCHMARK:
SET MAG NAIL IN CONCRETE CURB JOINT AS SHOWN HEREON
FOUND ELEVATION = 372.31 FEET

REFERENCES

(R1) RECORD OF SURVEY RECORDED UNDER AUDITOR'S FILE NO. 7802060255

(R2) PLAT OF TROMBLEY HILL RECORDED UNDER AUDITOR'S FILE NO. 9812155001

(R3) SNOHOMISH COUNTY LARGE TRACT SEGREGATION 31(7–80) RECORDED UNDER AUDITOR'S FILE NO. 8103090166

(C) CALCULATED

(M) MEASURED

EQUIPMENT AND PROCEDURES

METHOD OF SURVEY:
SURVEY PERFORMED BY FIELD TRAVERSE
INSTRUMENTATION:
LEICA MS–50 ROBOTIC TOTAL STATION WITH DATA COLLECTOR AND LEICA GS–14 GPS MAINTAINED IN ADJUSTMENT TO MANUFACTURES SPECIFICATIONS AS REQUIRED BY WAC 332–130–100
PRECISION:
MEETS OR EXCEEDS STATE STANDARDS WAC 332–130–090

SURVEY NOTES

THIS SURVEY HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF PARTIES WHOSE NAMES APPEAR HEREON ONLY, AND DOES NOT EXTEND TO ANY UNNAMED THIRD PARTIES WITHOUT EXPRESS RECERTIFICATION BY THE LAND SURVEYOR.

BOUNDARY LINES SHOWN AND CORNERS SET REPRESENT DEED LOCATIONS; OWNERSHIP LINES MAY VARY. NO GUARANTEE OF OWNERSHIP IS EXPRESSED OR IMPLIED. THIS SURVEY WAS PERFORMED WITH THE BENEFIT OF A TITLE REPORT FROM CHICAGO TITLE INSURANCE COMPANY (COMMITMENT NO. 500076500 / COMMITMENT DATE: SEPTEMBER 14, 2018 AT 08:00 AM).

APPROVED
BY PLANNING
Name:
Date: 07/09/2019

RECEIVED
05/14/19
CITY OF MONROE

0 50 100
PLAN IN FEET

811 Know what's below. Call before you dig.

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDGE — STATE OF WASHINGTON — 36081 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY SUBDIVISON AND PRD SITE PLAN

SNOHOMISH COUNTY, WA

CITY OF MONROE

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

CP|H CONSULTANTS
Site Planning • Civil Engineering
Land Use Consulting • Project Management
11431 Willows Rd. NE, Suite 120
Redmond, WA 98052
Phone: (425) 285-2390 | FAX: (425) 285-2389
www.cphconsultants.com

PROJECT NO.
0035-18-27

DRAWING
P2.00

SHEET 4 OF 18

P:\project\0035\18027\Dwg\Sheets\Preliminary Plat\P2.00.dwg
5/13/2019 3:41 PM CASEY TORRES

RECEIVED 2/6/2018

ATTACHMENT #4

MONROE
WASHINGTON

COMMUNITY DEVELOPMENT

806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

FOR OFFICE USE ONLY
PERMIT #(s) PLPRD2019-01
PPlat #5591/PRD #5922
SEPA - #5923/SEPA2019-03

COMBINED PERMIT APPLICATION

PERMIT SUBMITTAL HOURS

MONDAY – FRIDAY 8:00 – 12:00 / 1:00 – 5:00

Building

- ☐ Commercial T/I
- ☐ Demolition
- ☐ Garage/Carport
- ☐ Mechanical
- ☐ New Construction (Commercial/Residential)
- ☐ Plumbing
- ☐ Racking
- ☐ Residential Remodel
- ☐ Sign
- ☐ Other _____

Operations

- ☐ Engineering Review
- ☐ Fencing
- ☐ Grading
- ☐ Retaining wall
- ☐ Rockery
- ☐ Right-of-Way Disturbance
- ☐ Special Flood Hazard Area
- ☐ Utility Service
- ☐ Other _____

Fire

- ☐ Fire Alarm
- ☐ Fire Sprinkler
- ☐ High Piled Storage
- ☐ Hood Suppression
- ☐ Operational
- ☐ Spray Booth
- ☐ Tents & Canopies
- ☐ Other _____

Land Use

- ☐ Accessory Dwelling Unit
- ☐ Boundary Line Adjustment /Lot Consolidation
- ☐ Conditional/Special Use
- ☐ Land Clearing/Forest Practices
- ☒ Planned Residential Development
- ☐ Shoreline Permit
- ☐ Short Plat
- ☒ Subdivision/Plat
- ☐ Variance
- ☐ Other _____

NOTE: All required Electrical Permits will be issued by the Dept. of Labor & Industries.

THIS APPLICATION WILL NOT BE ACCEPTED WITHOUT COMPLETED SUBMITTAL REQUIREMENTS

Site Address or Property Location: 18830 134th Street SE, Monroe, WA 98272

Size of site (acre/square feet): 4.75 acres

Assessor's Tax Parcel Number (14 digits): 28063600101900

Applicant: SSHI, LLC dba DR Horton c/o CPH Consultants (agent) Phone # (425) 285-2390

*Signature: _____ Printed Name: Matthew J. Hough, PE (agent)

Mailing Address: 11431 Willows Road NE, Suite 120 Fax # (425) 285-2389

City Redmond State WA Zip 98052 E-mail matt@cphconsultants.com

Property Owner: Mateo & Bella Barajas Phone # ( ) 425.239.8462

**Signature: _____ Printed Name: Mateo Barajas

Mailing Address: 21020 Calhoun Road Fax # ( ) _____

City Monroe State WA Zip 98272 E-mail lxtapamonroe@outlook.com

Attach a separate sheet for additional property owners/additional addresses

***Applicant: By your signature above, you hereby certify that the information submitted is true and correct and that you are authorized by the property owner(s) to act on their behalf.**

****Property Owners: by your signature above, you hereby certify that you have authorized the above applicant to make application on your behalf for this application.**

City of Monroe
Land Use Permit Application- Page 2

Give a detailed description below of the proposal / work. Provide details specific to your application e.g., current and proposed lot sizes, number of lots, description of driveway, description of proposed business including hours of operation, number of employees, existing and proposed parking spaces.

Forest Tax Reporting Account Number (if harvesting timber call the Department of Revenue at (800) 548-8829 for tax reporting information or to receive a tax number):

Detailed Description of work:

The project proposes to subdivide one existing real parcel totaling approximately 4.75 acres (280636-00101900) into 19 detached single-family residential lots under the City's current subdivision and PRD code. The north boundary of the subject site fronts the south right-of-way of 134th Street SE. Improvements will include roadway widening and pedestrian facilities along the south side of 134th Street SE along the site frontage, public roadway and pedestrian facilities on-site, storm drainage control facilities, and extension of existing City water and sanitary sewer mains to serve the new residences.

FOR OFFICE USE ONLY

Planning Application Fee:_____	Publication Fee:_____
Fire Plan Check Fee:_____	Mailing Fee: _____
SEPA Fee: _____	Technology Fee:_____
TOTAL FEES:_____	

CP|H
CONSULTANTS

Site Planning
Civil Engineering
Land Use Consulting
Project Management

January 31, 2019

City of Monroe
Department of Community Development
806 W. Main Street
Monroe, WA 98272

Re: Belmont Heights PRD—CPH Project No. 0035-18-027
Preliminary Subdivision and PRD Application
Project Narrative

City Review Staff,

This project narrative is provided on behalf of the Applicant to complete the preliminary subdivision and planned residential development (PRD) application for Belmont Heights PRD. The project site is comprised of one parcel (Tax Parcel # 280636-00101900) with a total area of approximately 4.75 acres. The existing parcel currently contains one single-family residence, associated structures and outbuildings, and a fenced yard consisting primarily of pasture. The site is bordered by single-family residences on all sides with access provided by 134th Street SE at its northerly frontage. The project plans to develop the property into 19 single-family residential lots in accordance with the City's Planned Residential Development (PRD) standards and consistent with the requirements of UR9600 zoning. This narrative is intended to introduce the project and summarize some of the key design elements of the proposal.

SITE PLAN, DENSITY, AND DIMENSIONS

The preliminary site plan and supporting technical data submitted with this application are a result of discussion with City staff, coordination with the various members of the project team, and alternative analyses. Monroe Municipal Code (MMC) Chapter 18.84 establishes a framework and criteria for the review and approval of PRDs in the City. The proposed project has been carefully designed in accordance with these and other provisions of the MMC as well as the current version of the City of Monroe Public Works Design and Construction Standards.

The property that comprises the project site is currently zoned UR9600. This zoning designation and standard subdivision criteria allow the site to be subdivided into a base density of 17 single-family residential lots. City code section 18.84.120 provides for up to a 30 percent density bonus which would allow a total of 22 units base on the gross site acreage. The project proposes to subdivide the site into 19 single-family lots and several common open space tracts. All lot dimensions, coverage, and setbacks are proposed in accordance with MMC 18.10.140.

Site design is largely affected by the topography of the site which generally descends from the northeast to the southwest with a total approximate vertical relief of 75 feet. The site plan has also oriented residential units away from an existing natural gas transmission main easement that encumbers the northwesterly portion of the site, and this area is planned to be improved into a large park area. The park use achieves a number of the PRD criteria and provides for a more compatible recreation and open space use of this area for the community.

ACCESS AND ROADWAYS

The site currently contains one single-family residence with a driveway connection to 134th Street SE, which has a through connection to the Trombley Hill development to the west and a through connection to 191st Avenue SE to the east. The primary access road that serves the internal road for the project is 134th Street SE.

Currently, 134th Street SE consists of 21 feet of asphalt pavement width with gutter, curb, planter, and sidewalk on the north side and a 1.5-foot asphalt wedge curb on the south side. The project would improve the southern half of the public right-of-way to a full urban pavement section with concrete curb, gutter, and sidewalk and a continuous planter strip.

The local street within the project will be public and is proposed in general accordance with the City's standard for Local Access with a slight reduction in the planter width between the back of curb and sidewalk in order to remain consistent with the planter width detailed in the City of Monroe cul-de-sac road section and to allow additional space behind the back of sidewalk to facilitate on-site grading. Three private access tracts are also proposed to serve some of the perimeter lots from the public Local Access street.

Gibson Traffic Consultants (GTC) completed a traffic impact analysis (TIA) for the project and a copy of that report is included with this application. The TIA includes a level-of-service (vehicular circulation adequacy) evaluation of the surrounding area. A total of two primary study intersections in the City of Monroe were analyzed as requested by City staff. GTC concluded that:

> *The level of service analysis shows that all the study intersections are anticipated to operate at acceptable levels of service except for Chain Lake Road at Rainier View Road SW, which will operate at LOS E in the 2028 baseline and future with development conditions. The intersection is planned for capacity improvements identified in the latest Comprehensive Plan.*

SITE SOILS, GRADING, AND STORM DRAINAGE

The general soil classification of the site is characterized by the Natural Resources Conservation Service (NRCS) as Tokul gravelly medial loam, with 0 to 15 percent slopes. A geotechnical engineering study was performed by Terra Associates, Inc. to evaluate the suitability of the site for the proposed development of a residential subdivision. They reported observed soils were, "glacial deposits comprised predominantly of medium dense to dense silty sand with gravel interpreted to be weathered till overlying unweathered till deposits consisting of dense to very dense, moderately- to strongly-cemented silty sand with gravel and occasional cobbles." It was concluded that there are no geotechnical considerations that preclude development of the site as currently planned. Grading will be limited to the extent necessary to support site development.

The project proposes a combined water quality/detention stormwater pond in the southern portion of the site to both treat and detain surface water runoff in accordance with the Department of Ecology's 2012 Stormwater Management Manual for Western Washington (SWMMWW) as amended in December 2014 and current Monroe Municipal Code (MMC). Runoff will be routed to the pond through a conventional, below-grade conveyance system located in the public right-of-way and private access tracts. A permanent wetpool storage volume in the bottom of the pond will provide basic water quality treatment prior to release of runoff to downstream facilities. The pond will release runoff at controlled rates to the existing Toivo Ridge stormwater conveyance system. Additional information on the proposed storm drainage systems is included in the enclosed preliminary Storm Drainage Report (SDR).

UTILITIES

Public water and sanitary sewer systems owned and operated by the City will be extended to provide service to the site. There is an existing 8-inch sewer stub located near the southwest corner of the site. This sewer line connects to the Toivo Ridge system and will be extended through the site and into the internal roads of the project. A sanitary sewer manhole will be placed near the eastern property line in the southeast portion of the site to provide a connection point for future development to the east.

There is an existing 8-inch ductile iron water main located in the northern half of the 134th St SE right-of-way. This water line is part of the 517 pressure zone and will provide sufficient pressure and flow to all proposed lots. The main will be extended into the property and terminate at a blow off assembly near the eastern property line in the southeast portion of the site. This will provide a connection point for future development to the east.

The accompanying preliminary subdivision and PRD plans provide additional detail of the proposed water and sanitary sewer systems for the project.

CRITICAL AREAS

No wetlands, streams, geologic hazards or other critical areas were observed or delineated on or in the near vicinity of the project site. A copy of the geotechnical report prepared by Terra Associates, Inc. (December 4, 2018) and a critical areas site investigation report by Wetland Resources, Inc. (January 29, 2019) are included with this application.

PARKS, RECREATION, AND OPEN SPACE

The City's PRD code, MMC 18.84, includes guidance for *Park and Recreational Usable Open Space*. It specifies that for each base dwelling unit in the UR9600 zone, a PRD is to provide 975 square feet per base residential unit toward park and recreational usable open space onsite. The 17 base dwelling units calculated for this project therefore require a total of 16,575 square feet of such space. The project accomplishes this with a park in Tract A. Tract A has an area of 23,498 square feet, which exceeds the minimum requirements of the PRD. Tract B is a centrally located Landscape tract with an area of 3,301 square feet and Tract C is an open space and storm drainage tract located in the southern portion of the site with an area of 43,210 square feet. In total, the project provides approximately 1.6 acres of total open space, or more than 33 percent of the total site area.

Tract A has been designed to optimize the amount of large contiguous usable area. It is interconnected by the public sidewalk facilities that will be constructed with the project. The preliminary landscape plans included with this application include details for the park amenities. These amenities include tables, benches, pathways and screening landscaping as required.

Please feel free to contact me directly if you have questions or require additional information to complete your review. I appreciate your time and efforts, and look forward to working with you through the preliminary subdivision and PRD approval.

Thank you.

Sincerely,

CPH Consultants

Matthew J. Hough, PE
President

Enclosures
Cc: Ms. Jennifer Reiner (D.R. Horton)
copy to file

MONROE
WASHINGTON

February 25, 2019

SSHI LLC dba DR Horton c/o CPH Consultants
Matthew J. Hough, PE
11431 Willows Road NE, Suite 120
Redmond, WA 98052

RE: Notice of Complete Application for Belmont Heights Preliminary Plat/PRD

File No. PLPRD2019-01

Dear Mr. Hough,

Your land use permit application which was submitted to the City of Monroe on February 6, 2019 for preliminary plat/planned residential development approval has been determined **COMPLETE** as of **February 25, 2019**. A complete application is not an approved application. A permit application is complete when it meets the submission requirements outlined in the Monroe Municipal Code. The City's determination of completeness does not preclude the City from requesting revisions, additional information or studies if new information is required, corrections are needed, or where there are substantial changes in the proposed action.

A decision will be made within 90 days of the date of the letter of completeness excluding time periods as described in MMC 21.50.110. If you have any questions and/or wish to discuss any portion of the enclosure of your application, please feel free to contact me at (360) 863-4513 or amarrero@monroewa.gov.

Sincerely,

Anita Marrero
Senior Planner

Cc: File
Mateo & Bella Barajas, 21020 Calhoun Road, Monroe, WA 98272

City of Monroe
806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

City of Monroe
806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

NOTICE OF LAND USE APPLICATION USING THE OPTIONAL DNS PROCESS

NOTICE IS HEREBY GIVEN that the City of Monroe has received an application for a Preliminary Plat and Planned Residential Development as described below:

PROJECT NAME: Belmont Heights Preliminary Plat/Planned Residential Development

PROJECT FILE#: PLPRD2019-01

APPLICANT: Matthew J. Hough, PE on the behalf of CPH Consultants

OWNER: Mateo & Bella Barajas, 21020 Calhoun Road, Monroe, WA 98272

PROJECT LOCATION: The site is located at 18830 134th Street SE, Monroe, Washington, 98272. Snohomish County Tax Parcel Number: 28063600101900.

PROJECT DESCRIPTION: The applicant is requesting preliminary plat and planned residential development approval for a 19-lot subdivision on approximately 4.75 acres in the Urban Residential (UR9600) zoning district with associated grading, drainage improvements, landscaping, and street frontage improvements. The existing single-family residence will be demolished. The proposed development will take access off of 134th Street SE.

PERMITS/APPROVALS REQUIRED: Preliminary Subdivision Approval, Preliminary Planned Residential Development Approval, Environmental Review, Grading/Engineering Permits, and any State and Federal Permits if applicable.

STUDIES REQUIRED: Traffic Study, Drainage Report, Environmental Checklist, Geotechnical Report, Critical Areas Report.

ENVIRONMENTAL REVIEW: The City of Monroe has reviewed the proposed project for probable adverse environmental impacts and expects to issue a determination of non-significance for this project. The optional DNS process in WAC 197-11-355 is being used. Consequently, this may be the only opportunity to comment on the environmental impacts of this proposal. The proposal may include mitigation measures under applicable codes, and the project may incorporate or require mitigation measures regardless of whether an EIS is prepared. A copy of the subsequent threshold determination for the specific proposal may be obtained upon request.

APPLICATION PROCESS: A preliminary plat/PRD application is a public hearing review process per City of Monroe Municipal Code (MMC) Chapter(s) 18.84.110 (D) and 21.20.050(F). This project requires a public hearing and decision before the Hearing Examiner.

APPLICATION DATE: February 6, 2019

NOTICE OF COMPLETE APPLICATION: February 25, 2019

DATE OF NOTICE OF APPLICATION: February 27, 2019

PUBLIC COMMENT PROCEDURE: Submit written comments on or before **5 p.m., March 13, 2019.** Comments should address completeness of the application, quality or quantity of information presented, and the project's conformance to applicable plans or code.

PUBLIC HEARING: A public hearing is required for this project and will be noticed separately.

STAFF CONTACT: Anita Marrero, Senior Planner @ (360) 863-4513 or amarrero@monroewa.gov

All documents are available for review Monday-Friday, 8:00-5:00 p.m., excluding holidays, at Monroe City Hall, 806 West Main St Monroe, WA 98272 and online at: http://www.monroewa.gov.

A decision on the application will be made within ninety (90) days of the date of the letter of completeness.

Everett Daily Herald

Affidavit of Publication

State of Washington }
County of Snohomish } ss

Dicy Sheppard being first duly sworn, upon oath deposes and says: that he/she is the legal representative of the Everett Daily Herald a daily newspaper. The said newspaper is a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the first publication of the Notice hereinafter referred to, published in the English language continually as a daily newspaper in Snohomish County, Washington and is and always has been printed in whole or part in the Everett Daily Herald and is of general circulation in said County, and is a legal newspaper, in accordance with the Chapter 99 of the Laws of 1921, as amended by Chapter 213, Laws of 1941, and approved as a legal newspaper by order of the Superior Court of Snohomish County, State of Washington, by order dated June 16, 1941, and that the annexed is a true copy of EDH846328 PLPRD2019-01 as it was published in the regular and entire issue of said paper and not as a supplement form thereof for a period of 1 issue(s), such publication commencing on 02/27/2019 and ending on 02/27/2019 and that said newspaper was regularly distributed to its subscribers during all of said period.

The amount of the fee for such publication is $81.20.

Dicy Sheppard

Subscribed and sworn before me on this 27th day of February 2019.

Diana L Beaver

Notary Public in and for the State of Washington.

City Of Monroe | 14103247
LEIGH ANNE BARR

DIANA L BEAVER
NOTARY PUBLIC
COMMISSION EXPIRES
4-29-21
STATE OF WASHINGTON

Classified Proof

CITY OF MONROE, WASHINGTON
NOTICE OF LAND USE APPLICATION
USING THE OPTIONAL DNS PROCESS

NOTICE is hereby given that the City of Monroe has received an application for a Preliminary Plat and Planned Residential Development as described below: PROJECT NAME: Belmont Heights Preliminary Plat/Planned Residential Development PROJECT FILE#: PLPRD2019-01 APPLICANT: Matthew J. Hough, PE on the behalf of CPH Consultants OWNER: Mateo & Bella Barajas, 21020 Calhoun Road, Monroe, WA 98272 PROJECT LOCATION: The site is located at 18830 134th Street SE, Monroe, Washington, 98272. Snohomish County Tax Parcel Number: 28063600101900. PROJECT DESCRIPTION: The applicant is requesting preliminary plat and planned residential development approval for a 19-lot subdivision on approximately 4.75 acres in the Urban Residential (UR9600) zoning district with associated grading, drainage improvements, landscaping, and street frontage improvements. The existing single-family residence will be demolished. The proposed development will take access off of 134th Street SE. PERMITS/APPROVALS REQUIRED: Preliminary Subdivision Approval, Preliminary Planned Residential Development Approval, Environmental Review, Grading/ Engineering Permits, and any State and Federal Permits if applicable. STUDIES REQUIRED: Traffic Study, Drainage Report, Environmental Checklist, Geotechnical Report, Critical Areas Report. ENVIRONMENTAL REVIEW: The City of Monroe has reviewed the proposed project for probable adverse environmental impacts and expects to issue a determination of non-significance for this project. The optional DNS process in WAC 197-11-355 is being used. Consequently, this may be the only opportunity to comment on the environmental impacts of this proposal. The proposal may include mitigation measures under applicable codes, and the project may incorporate or require mitigation measures regardless of whether an EIS is prepared. A copy of the subsequent threshold determination for the specific proposal may be obtained upon request. APPLICATION PROCESS: A preliminary plat/PRD application is a public hearing review process per City of Monroe Municipal Code (MMC) Chapter(s) 18.84.110 (D) and 21.20.050(F). This project requires a public hearing and decision before the Hearing Examiner. APPLICATION DATE: February 6, 2019 NOTICE OF COMPLETE APPLICATION: February 25, 2019 DATE OF NOTICE OF APPLICATION: February 27, 2019 PUBLIC COMMENT PROCEDURE: Submit written comments on or before 5 p.m., March 13, 2019. Comments should address completeness of the application, quality or quantity of information presented, and the project's conformance to applicable plans or code. PUBLIC HEARING: A public hearing is required for this project and will be noticed separately. STAFF CONTACT: Anita Marrero, Senior Planner @ (360) 863-4513 or amarrero@monroewa.gov All documents are available for review Monday-Friday, 8:00-5:00 p.m., excluding holidays, at Monroe City Hall, 806 West Main St Monroe, WA 98272 and online at: http://www.monroewa.gov. A decision on the application will be made within ninety (90) days of the date of the letter of completeness.

Published: February 27, 2019. EDH846328

AFFIDAVIT OF POSTING
NOTICE OF APPLICATION

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

18830 134th St SE Monroe, WA, 98272
Project location

Belmont Heights (PLPRD2019-01)
Application Name and File Number

I, Jamie Woolworth being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the **27th** day of **February, 2019**, I posted (1) **Notice of Application for the Belmont Heights Preliminary Plat and PRD** on site; and on the correct date of posting of said notice, to wit:

18830 134th St SE Monroe, WA, 98272
Location of Notice

Jamie Woolworth
Signed

Subscribed and sworn to me this 4th day of March, 2019

NOTARY SEAL

KIM M SHAW
COMMISSION EXPIRES
NOTARY
PUBLIC
06-03-20
STATE OF WASHINGTON

Kim M. Shaw
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Kim M. Shaw

My commission expires: 6/3/2020

AFFIDAVIT OF POSTING
NOTICE OF APPLICATION

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

18830 134th St SE Monroe, WA, 98272
Project location

Belmont Heights (PLPRD2019-01)
Application Name and File Number

I, Leigh Anne Barr being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the **27h** day of **February, 2019**, that I posted (2) **Notice of Application for the Belmont Heights Preliminary Plat and PRD** at Monroe City Hall and the Monroe Library at the following addresses:

806 West Main Street, Monroe, WA 98272 / 1070 Village Way, Monroe, WA 98272
Location of notice

L. Barr
Signed

Subscribed and sworn to me this 28th day of February, 2019

NOTARY SEAL

VICKI L. THAYER NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 5-09-20

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Vicki L Thayer

My commission expires: May 9, 2020

AFFIDAVIT OF MAILING
LAND USE APPLICATION

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

18830 134th St SE Monroe, WA, 98272
Project location

Belmont Heights (PLPRD2019-01)
Application Name and File Number

I, **Leigh Anne Barr**, being first duly sworn on oath depose and say that on the **26th** day of **February, 2019,** made application with Click to Mail to mail on **February 27th , 2019,** a copy with prepaid postage of the **Notice of Land Use Application for Belmont Heights Preliminary Plat and PRD.** Attached are a list of names and addresses to whom this information was mailed and the Click to Mail receipt.

L. Barr
Signed

Subscribed and sworn to me this 28th day February, 2019

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

NOTARY SEAL

VICKI L. THAYER NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 5-09-20

Snohomish County

Printed Name: Vicki L Thayer

My commission expires: May 9, 2020

OwnerNameLabelFormat	OwnerAddr	OwnerCity	OwnerStat	OwnerZIP
Sshi LLC	12910 Totem Lake Blvd NE Ste 220	Kirkland	WA	98034
Tom Trombley	13224 191st Ave SE	Monroe	WA	98272
Robert & Kathryn Jackson	13328 191st Ave SE	Monroe	WA	98272
Betty Cavner & Cathy McCain	13508 191st Ave SE	Monroe	WA	98272
Ryan & Leigh Norton	13536 190th Dr SE	Monroe	WA	98272
Ryan Dolan	13559 190th Dr SE	Monroe	WA	98272
Gregory Peck & Tracy Canady-Peck	13571 190th Dr SE	Monroe	WA	98272
Cody Farmer & Nataliya Pogodina	13585 190th Dr SE	Monroe	WA	98272
Stacy & Suzanne Swanigan	13593 190th Dr SE	Monroe	WA	98272
Steven Knechtel Sr & Nancy Knechtel	13736 Hemlock Dr SE	Monroe	WA	98272
Katherine & Matthew Epstein	13737 Hemlock Dr SE	Monroe	WA	98272
MacKenzie Rubideaux & N Oshua	13740 Fir Dr SE	Monroe	WA	98272
Thomas & Tamra Dumolt	13741 Fir Dr SE	Monroe	WA	98272
Mark Brown	13742 Pine Ln	Monroe	WA	98272
Katheryne & Brandon Halliday	13759 Hemlock Dr SE	Monroe	WA	98272
Sharon McGee	13762 Fir Dr SE	Monroe	WA	98272
Shannon Lagerstrom	13764 Pine Ln SE	Monroe	WA	98272
Eric English	13766 Hemlock Dr SE	Monroe	WA	98272
Robert & Betty Anderson	14230 128th Pl NE	Kirkland	WA	98034
Andrew Nelson	16414 NE 96th Pl	Redmond	WA	98052
Daniel & Jaime Manalo	17685 Hamberg St SE	Monroe	WA	98272
Pacific Ridge-Drh LLC	17921 Bothell Everett Hwy Ste 100	Bothell	WA	98012
Hpa Borrower 2016-1 LLC	180 N Stetson Ave Ste 3650	Chicago	IL	60601
Leonard & Dione Anterola	18615 Rainier View Rd SE	Monroe	WA	98272
Tom Kendrick	18627 Rainier View Dr SE	Monroe	WA	98272
Jeffrey Sabourin & Chermeen Antia	18651 Rainier View Rd SE	Monroe	WA	98272
Timothy & Morgan Papka	18663 Rainier View Rd SE	Monroe	WA	98272
Jose Urrutia & Vilma Melendrez	18679 Rainier View Rd SE	Monroe	WA	98272
Robert Apgood	18709 137th St SE	Monroe	WA	98272
Andrea & Matthew Jankowski	18741 137th St SE	Monroe	WA	98272
Logan & Jessica Miller	18763 137th St SE	Monroe	WA	98272
Jonathan Newsom	18795 137th St SE	Monroe	WA	98272
Brian & Mandy Metcalf	18809 137th St SE	Monroe	WA	98272
Eric Johnson & Lacie Turnbull	18816 136th Pl SE	Monroe	WA	98272
Robert & Brooke Lomans	18834 136th Pl SE	Monroe	WA	98272
Jose & Rose Rodriguez	18837 136th Pl SE	Monroe	WA	98272
Dane & Stephanie Sydow	18840 137th St SE	Monroe	WA	98272
Khoa Tra & Tracy	18850 136th Pl SE	Monroe	WA	98272
Colin & Karolina Martin	18853 136th Pl SE	Monroe	WA	98272
Robin Davis	18867 137th St SE	Monroe	WA	98272
Jeremy & Doreen Likness	18871 136th Pl SE	Monroe	WA	98272
Javier & Jung Patton	18883 136th Pl SE	Monroe	WA	98272
Nicholas French & Kimberly Stoll-French	18894 136th Pl SE	Monroe	WA	98272
Travis & Paige Sprague	18921 137th St SE	Monroe	WA	98272
John & Julie Viera	18922 136th Pl SE	Monroe	WA	98272
Kevin & Karen Richardson	18948 136th Pl SE	Monroe	WA	98272

Christopher & Elke Pierson	18949 136th Pl SE	Monroe	WA	98272
Allison Molstad	18949 137th St SE	Monroe	WA	98272
Casey & Robert Burnaroos	18963 136th Pl SE	Monroe	WA	98272
Eric & Erin Fraser	18973 137th St SE	Monroe	WA	98272
Jackie & Jason Byrd	18974 136th Pl SE	Monroe	WA	98272
John & Karen Xenos	18981 136th Pl SE	Monroe	WA	98272
Matthew & Rebecca Bettilyon	18997 136th Pl SE	Monroe	WA	98272
Jonathan & Vanessa Capone	19019 137th St SE	Monroe	WA	98272
Scott Davidson	19053 137th St SE	Monroe	WA	98272
Robert Pryor & Cochrane Pamela	28 Hazel Ave	Mill Valley	CA	94941
Cti Towers Assets I LLC	38 Pond St Ste 305	Franklin	MA	02038
Eugene Park	4779 Morris Ave S #u-101	Renton	WA	98055
Lee Pacific Properties Inc	6107 SW Murray Blvd	Beaverton	OR	97008
Roberto & Blas Siliceo	6910 Old Redmond Rd Unit H124	Redmond	WA	98054
City of Monroe	806 W Main St	Monroe	WA	98272
Rpm-M LLC	8622 224th Ave NE	Redmond	WA	98053
Julien Jeannot & Sabine Clemens	8721 Shadow Wood Dr Unit B	Everett	WA	98208
Rita Clay	PO Box 1086	Monroe	WA	98272
North Crest Dev Corp	PO Box 340	Edmonds	WA	98020

AFFIDAVIT OF EMAILING
NOTICE OF LAND USE APPLICATION

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

18830 134th St SE Monroe, WA, 98272
Project location

Belmont Heights (PLPRD2019-01)
Application Name and File Number

I, **Leigh Anne Barr**, being first duly sworn on oath depose and say that on the **27th** day of **February, 2019**, I emailed the **Notice of Land Use Application for the Belmont Heights Preliminary Plat & Preliminary Planned Residential Development located at 18830 134th St SE, Monroe, Washington 98272.** Attached is a list of email addresses to whom this information was emailed.

L. Barr
Signed

Subscribed and sworn to me this 28th day February, 2019

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

NOTARY SEAL

Snohomish County

Printed Name: Vicki L Thayer

My commission expires: May 9, 2020

separegister@ecy.wa.gov; pspirito@sno-isle.org; lanthony@sno-isle.org; Justin.fontes@ftr.com; david.matulich@pse.com; john_warrick@cable.comcast.com; crenderlein@snopud.com; Kate.Tourtellot@commtrans.org; Neilwheeler@comcast.net; Eileen.lefebvre@providence.org; piplicd@monroe.wednet.edu; Gretchen.Kaehler@DAHP.wa.gov; sharon.swan@snoco.org; Diane.Rolph@co.snohomish.wa.us; mfitzgerald@snofire7.org; k.kerwin@snoco.org; SEPA@pscleanair.org; stevev@pscleanair.org; eip@parks.wa.gov; sposner@utc.wa.gov; kmclain@agr.wa.gov; ike.nwankwo@commerce.wa.gov; reviewteam@commerce.wa.gov; sepadesk@dfw.wa.gov; efheinitz@doc1.wa.gov; sepacenter@dnr.wa.gov; ramin.pazooki@wsdot.wa.gov; randy.kline@parks.wa.gov; somers.elaine@epa.gov; epa-seattle@epa.gov; Stan.Allison@faa.gov; Karen.Wood-McGuiness@fema.dhs.gov; kjoseph@sauk-suiattle.com; njoseph@sauk-suiattle.com; jjoseph@sauk-suiattle.com; ryoung@tulaliptribes-nsn.gov; klyste@stillaguamish.com; pstevenson@stillaguamish.com; newstips@heraldnet.com; mmuscari@esassoc.com; info@PPTValley.org; tom.laufmann@sno.wednet.edu; rooseveltwater@frontier.com; staff@highlandwaterdistrict.com; bewood@snopud.com; faye.ryan@pse.com; dan.o.olson@williams.com; shannon.fleming@snoco.org; zlamebull@tulaliptribes-nsn.gov; wrightp@wsdot.wa.gov; mrobenland@doc1.wa.gov; mannixj@monroe.wednet.edu ; hansenh@monroe.wednet.edu; JPrichard@republicservices.com; rodrijr@dshs.wa.gov; EHquestions@snohd.org; serviceaddresscorrec@pse.com; Jennifer.lee@psp.wa.gov; Galeeb.kachra@noaa.gov

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

Providing quality water, power and service at a competitive price that our customers value

April 4, 2019

Anita Marrero
City of Monroe
806 W. Main Street
Monroe, WA 98272

Dear Ms. Marrero:

Reference No.: PLP2019 01 Belmont Heights

District DR Number: 19-037

The District presently has sufficient electric system capacity to serve the proposed development. However, the existing District facilities in the local area may require upgrading. The developer is required to supply the District with suitable locations/easements on all parcels where electrical facilities must be installed to serve the proposed development. It is unlikely that easements will be granted on District-owned property, or consents granted within District transmission line corridors.

New service for this project should be from the west. Existing PUD facilities may need relocations or modifications at the developer's expense. Any relocation, alteration or removal of District facilities to accommodate this project shall be at the expense of the project developer, and must be coordinated with the PUD in advance of final design. Please include any utility work in all applicable permits.

Cost of any work, new or upgrade, to existing facilities that is required to connect this proposed development to the District electric system shall be in accordance with the applicable District policy. The developer will be required to supply the District with suitable locations/easements upon its property for any electrical facilities that must be installed to serve the proposed development.

Please contact the District prior to design of the proposed project. For information about specific electric service requirements, please call the District's Monroe office at 360-794-3903 to contact a Customer Engineer.

Sincerely,

for Jason Zyskowski
Senior Manager
Planning, Engineering, & Technical Services

DETERMINATION OF NON-SIGNIFICANCE (DNS)

File Number: SEPA 2019-03

Name of Proposal: Belmont Terrace (formerly Belmont Heights) Preliminary Plat/Planned Residential Development

Description of Proposal: The applicant is requesting preliminary plat and planned residential development approval for a 19-lot subdivision on approximately 4.75 acres in the Urban Residential (UR9600) zoning district with associated grading, drainage improvements, landscaping, and street frontage improvements. The existing single-family residence will be demolished. The proposed development will take access off of 134th Street SE.

Proponent: SSHI, LLC dba D.R. Horton
11241 Slater Avenue NE, Suite 200
Kirkland, WA 98033

Location of Proposal: The site is located at 18830 134th Street SE, Monroe, Washington, 98272. Snohomish County Tax Parcel Number: 28063600101900.

Lead Agency: City of Monroe

Threshold Determination: The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) IS NOT required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public for review upon request at Monroe City Hall, 806 West Main Street, Monroe, WA 98272 between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays. The information is also available for view online at www.monroewa.gov/belmont-terrace.

- ☐ There is no comment period for this DNS.
- ☒ This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.
- ☐ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below.

Responsible Official: Ben Swanson, Community Development Director
SEPA Responsible Official
(360) 863-4544
Monroe City Hall
806 West Main Street
Monroe, WA 98272
bswanson@monroewa.gov

Date: 5/8/19 **Signature:** _____

Date of Issuance: May 10, 2019

Deadline for Appeals: No later than 5:00 p.m. on May 24, 2019

Appeals: You may appeal this determination to the City of Monroe Hearing Examiner at Monroe City Hall, which is located at 806 West Main Street, Monroe, WA 98272, no later than **5:00 p.m. on May 24, 2019**. You should be prepared to make specific factual objections; and you shall set forth the specific reason, rationale, and/or basis for the appeal. Appeals must be made in person on City appeal forms, which are available through the Community Development Department at Monroe City Hall. Appeals must be filed in original form in accordance with MMC Chapter 21.60. Payment of the appeal fee, as specified in the city's fee resolution, shall occur at the time the appeal is filed. Please contact Kim Shaw, Land Use Permit Supervisor, by email at KShaw@monroewa.gov or by phone at (360) 863-4532 to read or ask about the procedures for SEPA appeals.

Staff Contact: Questions about the proposal may be directed to Anita Marrero, Senior Planner, at amarrero@monroewa.gov or (360) 863-4513.

City of Monroe
806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

NOTICE OF RESCHEDULED PUBLIC HEARING

NOTICE IS HEREBY GIVEN that a **PUBLIC HEARING** is scheduled to be held on the proposed **BELMONT TERRACE** (formally Belmont Heights) **PRELIMINARY PLAT AND PLANNED RESIDENTIAL DEVELOPMENT (PRD)** on **TUESDAY, JULY 16, 2019 AT 3:00 P.M.** by the City of Monroe Hearing Examiner in the Council Chambers at City Hall, located at 806 W Main St, Monroe, WA.

PROJECT NAME: Belmont Terrace Preliminary Plat/PRD

PROJECT FILE#: PLPRD2019-01

APPLICANT: Matthew J. Hough, PE on the behalf of CPH Consultants

OWNER: Mateo & Bella Barajas, 21020 Calhoun Road, Monroe, WA 98272

PROJECT LOCATION: The site is located at 18830 134th Street SE, Monroe, Washington, 98272. Snohomish County Tax Parcel Number: 28063600101900.

PROJECT DESCRIPTION: The applicant is requesting preliminary plat and planned residential development approval for a 19-lot subdivision on approximately 4.75 acres in the Urban Residential (UR9600) zoning district with associated grading, drainage improvements, landscaping, and street frontage improvements. The existing single-family residence will be demolished. The proposed development will take access off of 134th Street SE.

PUBLIC COMMENTS: Anyone wishing to comment on the above items or to provide other relevant information may do so in writing or appear in person before the Hearing Examiner at the time and place of said public hearing. The Hearing Examiner is required to issue a final decision on this project pursuant to MMC 21.50.030(D). The Hearing Examiner's decision will be final and issued within 10 days of the public hearing.

PUBLIC REVIEW OF DOCUMENTS: The file is available for review during regular business hours, 8:00 a.m. – 5:00 p.m., Monday - Friday at Monroe City Hall, 806 West Main Street, Monroe WA. For more information, please contact landuse@monroewa.gov or call 360-863-4501. Project information is available on the city's website at: http://www.monroewa.gov/807/Belmont-Terrace.

STAFF CONTACT: Anita Marrero, Senior Planner at (360) 863-4513 or amarrero@monroewa.gov

Everett Daily Herald

Affidavit of Publication

State of Washington }
County of Snohomish } ss

Leanna Hartell being first duly sworn, upon oath deposes and says: that he/she is the legal representative of the Everett Daily Herald a daily newspaper. The said newspaper is a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the first publication of the Notice hereinafter referred to, published in the English language continually as a daily newspaper in Snohomish County, Washington and is and always has been printed in whole or part in the Everett Daily Herald and is of general circulation in said County, and is a legal newspaper, in accordance with the Chapter 99 of the Laws of 1921, as amended by Chapter 213, Laws of 1941, and approved as a legal newspaper by order of the Superior Court of Snohomish County, State of Washington, by order dated June 16, 1941, and that the annexed is a true copy of EDH863561 PLPRD2019-01 as it was published in the regular and entire issue of said paper and not as a supplement form thereof for a period of 1 issue(s), such publication commencing on 07/05/2019 and ending on 07/05/2019 and that said newspaper was regularly distributed to its subscribers during all of said period.

The amount of the fee for such publication is $55.10.

Leanna Hartell

Subscribed and sworn before me on this 11th day of July, 2019.

Diana L. Beaver

Notary Public in and for the State of Washington.

City Of Monroe | 14103247
LEIGH ANNE BARR

DIANA L BEAVER
NOTARY PUBLIC
COMMISSION EXPIRES
4-29-21
STATE OF WASHINGTON

Classified Proof

CITY OF MONROE, WASHINGTON
NOTICE OF RESCHEDULED PUBLIC HEARING

NOTICE is hereby given that a PUBLIC HEARING is scheduled to be held on the proposed BELMONT TERRACE (formally Belmont Heights) PRELIMINARY PLAT AND PLANNED RESIDENTIAL DEVELOPMENT (PRD) on TUESDAY, JULY 16, 2019 AT 3:00 P.M. by the City of Monroe Hearing Examiner in the Council Chambers at City Hall, located at 806 W Main St, Monroe, WA. PROJECT NAME: Belmont Terrace Preliminary Plat/PRD PROJECT FILE#: PLPRD2019-01 APPLICANT: Matthew J. Hough, PE on the behalf of CPH Consultants OWNER: Mateo & Bella Barajas, 21020 Calhoun Road, Monroe, WA 98272 PROJECT LOCATION: The site is located at 18830 134th Street SE, Monroe, Washington, 98272. Snohomish County Tax Parcel Number: 28063600101900. PROJECT DESCRIPTION: The applicant is requesting preliminary plat and planned residential development approval for a 19-lot subdivision on approximately 4.75 acres in the Urban Residential (UR9600) zoning district with associated grading, drainage improvements, landscaping, and street frontage improvements. The existing single-family residence will be demolished. The proposed development will take access off of 134th Street SE. PUBLIC COMMENTS: Anyone wishing to comment on the above items or to provide other relevant information may do so in writing or appear in person before the Hearing Examiner at the time and place of said public hearing. The Hearing Examiner is required to issue a final decision on this project pursuant to MMC 21.50.030(D). The Hearing Examiner's decision will be final and issued within 10 days of the public hearing. PUBLIC REVIEW OF DOCUMENTS: The file is available for review during regular business hours, 8:00 a.m. - 5:00 p.m., Monday - Friday at Monroe City Hall, 806 West Main Street, Monroe WA. For more information, please contact landuse@monroewa.gov or call 360-863-4501. Project information is available on the city's website at:
http://www.monroewa.gov/807/Belmont-Terrace.
STAFF CONTACT: Anita Marrero, Senior Planner at (360) 863-4513 or amarrero@monroewa.gov
Published: July 5, 2019. EDH863561

AFFIDAVIT OF MAILING
NOTICE OF PUBLIC HEARING

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

18830 134th St SE Monroe, WA, 98272
Project location

Belmont Terrace (PLPRD2019-01)
Application Name and File Number

I, **Leigh Anne Barr**, being first duly sworn on oath depose and say that on the **2nd** day of **July, 2019,** made application with Click to Mail to mail on **July 3rd, 2019,** a copy with prepaid postage of the **Notice of Public Hearing for Belmont Terrace Preliminary Plat and PRD.** Attached are a list of names and addresses to whom this information was mailed and the Click to Mail receipt.

L. Barr
Signed

Subscribed and sworn to me this 9th day July, 2019

NOTARY SEAL

Kimi M. Shaw
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Kimi M. Shaw

My commission expires: 6/3/2020

OwnerNameLabelFormat	OwnerAddr	OwnerCity	OwnerStat	OwnerZIP
Sshi LLC	12910 Totem Lake Blvd NE Ste 220	Kirkland	WA	98034
Tom Trombley	13224 191st Ave SE	Monroe	WA	98272
Robert & Kathryn Jackson	13328 191st Ave SE	Monroe	WA	98272
Betty Cavner & Cathy McCain	13508 191st Ave SE	Monroe	WA	98272
Ryan & Leigh Norton	13536 190th Dr SE	Monroe	WA	98272
Ryan Dolan	13559 190th Dr SE	Monroe	WA	98272
Gregory Peck & Tracy Canady-Peck	13571 190th Dr SE	Monroe	WA	98272
Cody Farmer & Nataliya Pogodina	13585 190th Dr SE	Monroe	WA	98272
Stacy & Suzanne Swanigan	13593 190th Dr SE	Monroe	WA	98272
Steven Knechtel Sr & Nancy Knechtel	13736 Hemlock Dr SE	Monroe	WA	98272
Katherine & Matthew Epstein	13737 Hemlock Dr SE	Monroe	WA	98272
MacKenzie Rubideaux & N Oshua	13740 Fir Dr SE	Monroe	WA	98272
Thomas & Tamra Dumolt	13741 Fir Dr SE	Monroe	WA	98272
Mark Brown	13742 Pine Ln	Monroe	WA	98272
Katheryne & Brandon Halliday	13759 Hemlock Dr SE	Monroe	WA	98272
Sharon McGee	13762 Fir Dr SE	Monroe	WA	98272
Shannon Lagerstrom	13764 Pine Ln SE	Monroe	WA	98272
Eric English	13766 Hemlock Dr SE	Monroe	WA	98272
Robert & Betty Anderson	14230 128th Pl NE	Kirkland	WA	98034
Andrew Nelson	16414 NE 96th Pl	Redmond	WA	98052
Daniel & Jaime Manalo	17685 Hamberg St SE	Monroe	WA	98272
Pacific Ridge-Drh LLC	17921 Bothell Everett Hwy Ste 100	Bothell	WA	98012
Hpa Borrower 2016-1 LLC	180 N Stetson Ave Ste 3650	Chicago	IL	60601
Leonard & Dione Anterola	18615 Rainier View Rd SE	Monroe	WA	98272
Tom Kendrick	18627 Rainier View Dr SE	Monroe	WA	98272
Jeffrey Sabourin & Chermeen Antia	18651 Rainier View Rd SE	Monroe	WA	98272
Timothy & Morgan Papka	18663 Rainier View Rd SE	Monroe	WA	98272
Jose Urrutia & Vilma Melendrez	18679 Rainier View Rd SE	Monroe	WA	98272
Robert Apgood	18709 137th St SE	Monroe	WA	98272
Andrea & Matthew Jankowski	18741 137th St SE	Monroe	WA	98272
Logan & Jessica Miller	18763 137th St SE	Monroe	WA	98272
Jonathan Newsom	18795 137th St SE	Monroe	WA	98272
Brian & Mandy Metcalf	18809 137th St SE	Monroe	WA	98272
Eric Johnson & Lacie Turnbull	18816 136th Pl SE	Monroe	WA	98272
Robert & Brooke Lomans	18834 136th Pl SE	Monroe	WA	98272
Jose & Rose Rodriguez	18837 136th Pl SE	Monroe	WA	98272
Dane & Stephanie Sydow	18840 137th St SE	Monroe	WA	98272
Khoa Tra & Tracy	18850 136th Pl SE	Monroe	WA	98272
Colin & Karolina Martin	18853 136th Pl SE	Monroe	WA	98272
Robin Davis	18867 137th St SE	Monroe	WA	98272
Jeremy & Doreen Likness	18871 136th Pl SE	Monroe	WA	98272
Javier & Jung Patton	18883 136th Pl SE	Monroe	WA	98272
Nicholas French & Kimberly Stoll-French	18894 136th Pl SE	Monroe	WA	98272
Travis & Paige Sprague	18921 137th St SE	Monroe	WA	98272
John & Julie Viera	18922 136th Pl SE	Monroe	WA	98272
Kevin & Karen Richardson	18948 136th Pl SE	Monroe	WA	98272

Christopher & Elke Pierson	18949 136th Pl SE	Monroe	WA	98272
Allison Molstad	18949 137th St SE	Monroe	WA	98272
Casey & Robert Burnaroos	18963 136th Pl SE	Monroe	WA	98272
Eric & Erin Fraser	18973 137th St SE	Monroe	WA	98272
Jackie & Jason Byrd	18974 136th Pl SE	Monroe	WA	98272
John & Karen Xenos	18981 136th Pl SE	Monroe	WA	98272
Matthew & Rebecca Bettilyon	18997 136th Pl SE	Monroe	WA	98272
Jonathan & Vanessa Capone	19019 137th St SE	Monroe	WA	98272
Scott Davidson	19053 137th St SE	Monroe	WA	98272
Robert Pryor & Cochrane Pamela	28 Hazel Ave	Mill Valley	CA	94941
Cti Towers Assets I LLC	38 Pond St Ste 305	Franklin	MA	02038
Eugene Park	4779 Morris Ave S #u-101	Renton	WA	98055
Lee Pacific Properties Inc	6107 SW Murray Blvd	Beaverton	OR	97008
Roberto & Blas Siliceo	6910 Old Redmond Rd Unit H124	Redmond	WA	98054
City of Monroe	806 W Main St	Monroe	WA	98272
Rpm-M LLC	8622 224th Ave NE	Redmond	WA	98053
Julien Jeannot & Sabine Clemens	8721 Shadow Wood Dr Unit B	Everett	WA	98208
Rita Clay	PO Box 1086	Monroe	WA	98272
North Crest Dev Corp	PO Box 340	Edmonds	WA	98020

AFFIDAVIT OF POSTING
NOTICE OF RESCHEDULED PUBLIC HEARING

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

18830 134th St SE Monroe, WA, 98272
Project location

Belmont Heights (PLPRD2019-01)
Application Name and File Number

I, Ron Payton being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the **5TH** day of **July, 2019**, I posted (1) **Notice of Rescheduled Public Hearing for the Belmont Heights Preliminary Plat and PRD** on site; and on the correct date of posting of said notice, to wit:

18830 134th St SE Monroe, WA, 98272
Location of Notice

Signed

Subscribed and sworn to me this 5th day of July, 2019

NOTARY SEAL

KIM M SHAW NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 06-03-20

Kim M. Shaw
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Kim M. Shaw

My commission expires: 6/3/2020

AFFIDAVIT OF POSTING
NOTICE OF PUBLIC HEARING

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

18830 134th St SE Monroe, WA, 98272
Project location

Belmont Terrace (PLPRD2019-01)
Application Name and File Number

I, Leigh Anne Barr being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the **3rd** day of **July, 2019**, that I posted (2) **Notice of Public Hearing for the Belmont Terrace Preliminary Plat and PRD** at Monroe City Hall and the Monroe Library at the following addresses:

806 West Main Street, Monroe, WA 98272 / 1070 Village Way, Monroe, WA 98272
Location of notice

L. Barr
Signed

Subscribed and sworn to me this 9th day of July, 2019

NOTARY SEAL

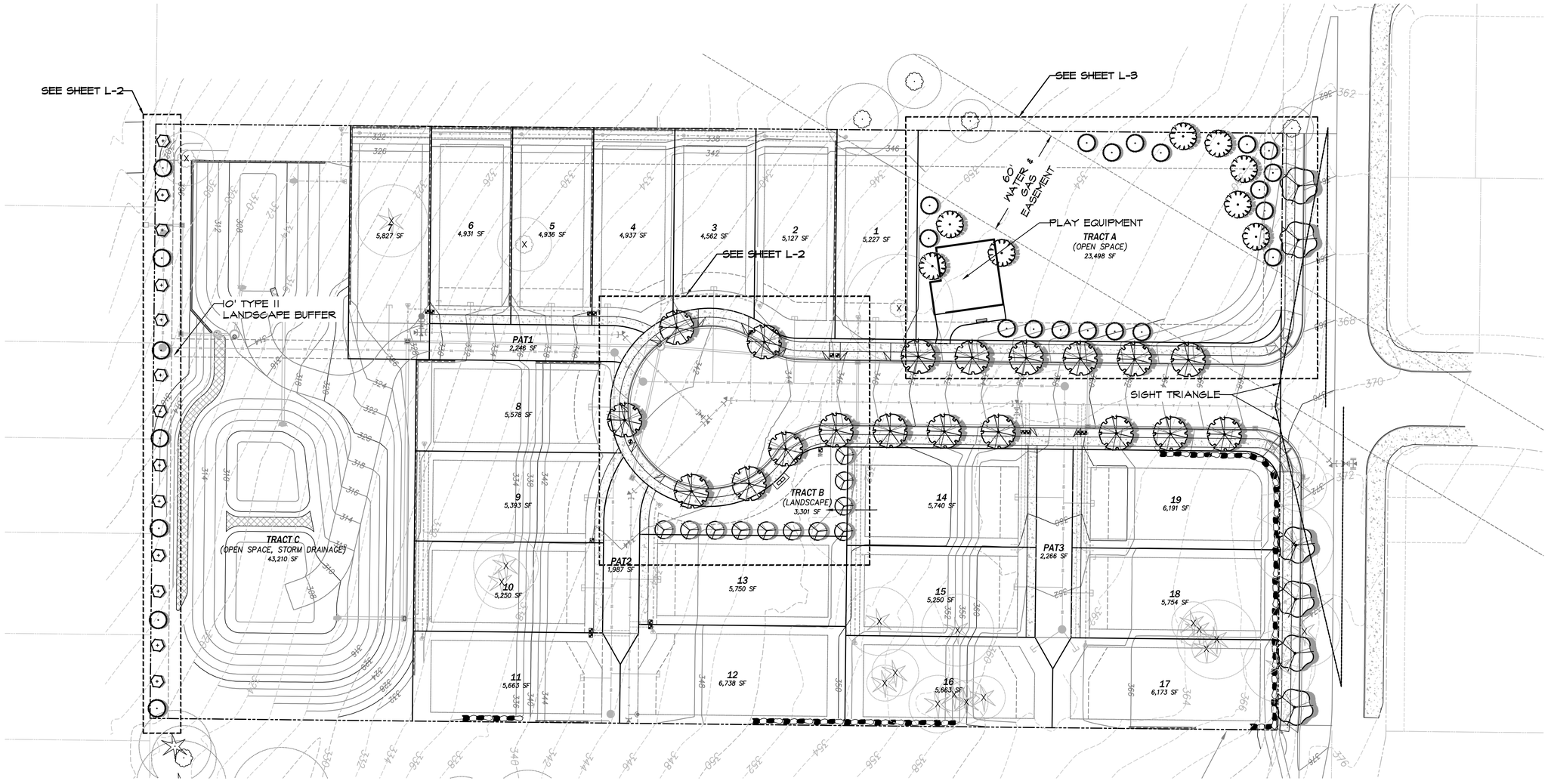
Kim M. Shaw
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Kim M. Shaw

My commission expires: 9/3/2020

KIM M SHAW
NOTARY PUBLIC
COMMISSION EXPIRES
06-03-20
STATE OF WASHINGTON



PLANT SCHEDULE ENTIRE SITE

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Acer circinatum / Vine Maple	1.5"Cal	13
	Acer rubrum 'Bowhall' / Bowhall Maple	1.5" Cal.	11
	Cercidiphyllum japonicum / Katsura Tree	1.5"Cal	8
EVERGREEN TREES	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**QTY**
	Thuja plicata 'Excelsa' / Excelsa Cedar	6'-8' Ht	25
STREET TREE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**QTY**
	Pyrus calleryana 'Capital' / Capital Callery Pear	2"Cal	19
	Zelkova serrata 'Musashino' / Musashino Zelkova	2"Cal	6

LANDSCAPE PLAN
SCALE: 1" = 30' - 0"

GRAPHIC SCALE
-30 0 15 30 60
(IN FEET)
1 inch = 30 feet

RECEIVED
05/14/2019
CITY OF MONROE

IRRIGATION PLAN NOTE:

PARK AND OTHER MAINTAINED LANDSCAPE AREAS WITHIN THE PROJECT,
INCLUDING PLANTER STRIP AREAS, SHALL BE IRRIGATED IN ACCORDANCE WITH APPLICABLE CITY OF MONROE MUNICIPAL CODE (MMC) AND PUBLIC WORKS STANDARDS. COMPLETE IRRIGATION PLANS AND SYSTEM DETAILS CONFORMING WITH THE PROVISIONS OF MMC 18.78.060 WILL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL WITH THE FINAL ENGINEERING PERMIT SUBMITTAL.

Drawn: ELK
Created: 1/31/19
2. 5/14/19 REVISED PER COMMENTS ELK

CRAMER DESIGN CONSULTANTS, INC.
LANDSCAPE ARCHITECT
1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
LOYLE L. CRAMER
CERTIFICATE NO. 634

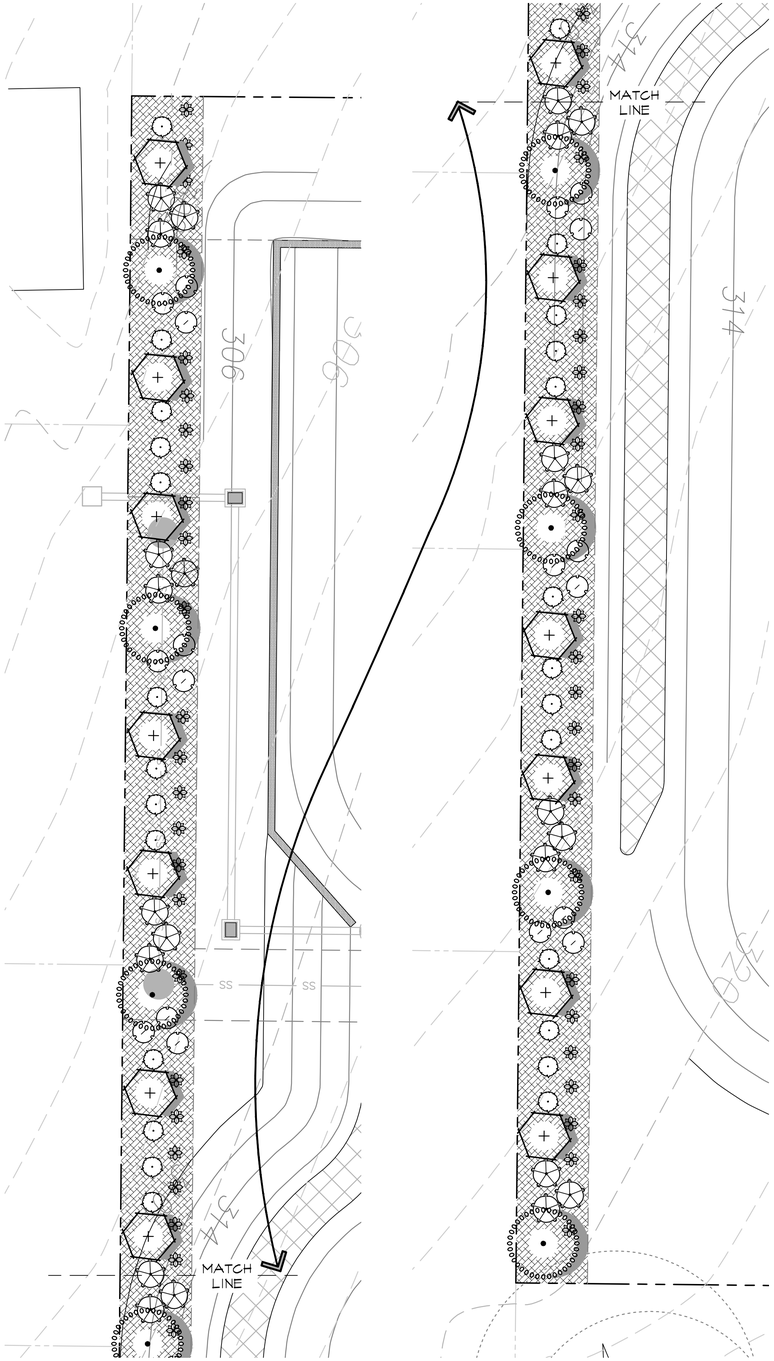
BELMONT TERRACE
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-1
OF 5 SHEETS

PTN. OF NE ¼ OF SEC 36, TWP 28 N, R6E W.M.

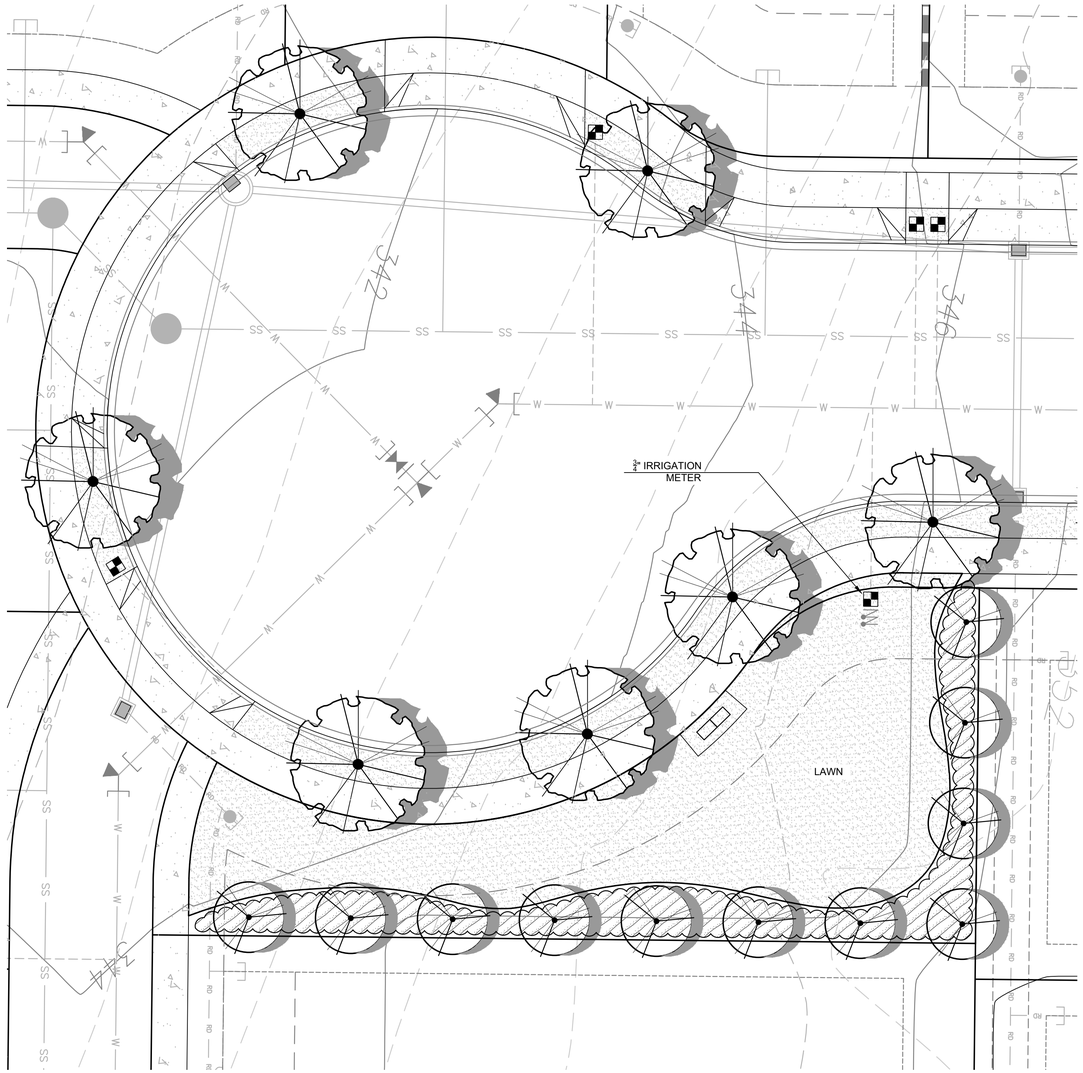
IRRIGATION PLAN NOTE:

PARK AND OTHER MAINTAINED LANDSCAPE AREAS WITHIN THE PROJECT, INCLUDING PLANTER STRIP AREAS, SHALL BE IRRIGATED IN ACCORDANCE WITH APPLICABLE CITY OF MONROE MUNICIPAL CODE (MMC) AND PUBLIC WORKS STANDARDS. COMPLETE IRRIGATION PLANS AND SYSTEM DETAILS CONFORMING WITH THE PROVISIONS OF MMC 18.78.060 WILL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL WITH THE FINAL ENGINEERING PERMIT SUBMITTAL.



LANDSCAPE BUFFER PLAN
SCALE: 1" = 10' - 0"

GRAPHIC SCALE
-10 0 5 10 20
(IN FEET)
1 inch = 10 feet



TRACT B LANDSCAPE PLAN
SCALE: 1" = 10' - 0"

GRAPHIC SCALE
-10 0 5 10 20
(IN FEET)
1 inch = 10 feet

Drawn: ELK
ELK

Created: 1/31/19
2. 5/14/19 REVISED PER COMMENTS

CRAMER DESIGN CONSULTANTS, INC.
LANDSCAPE ARCHITECT
1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
KYLE L. CRAMER
CERTIFICATE NO. 634

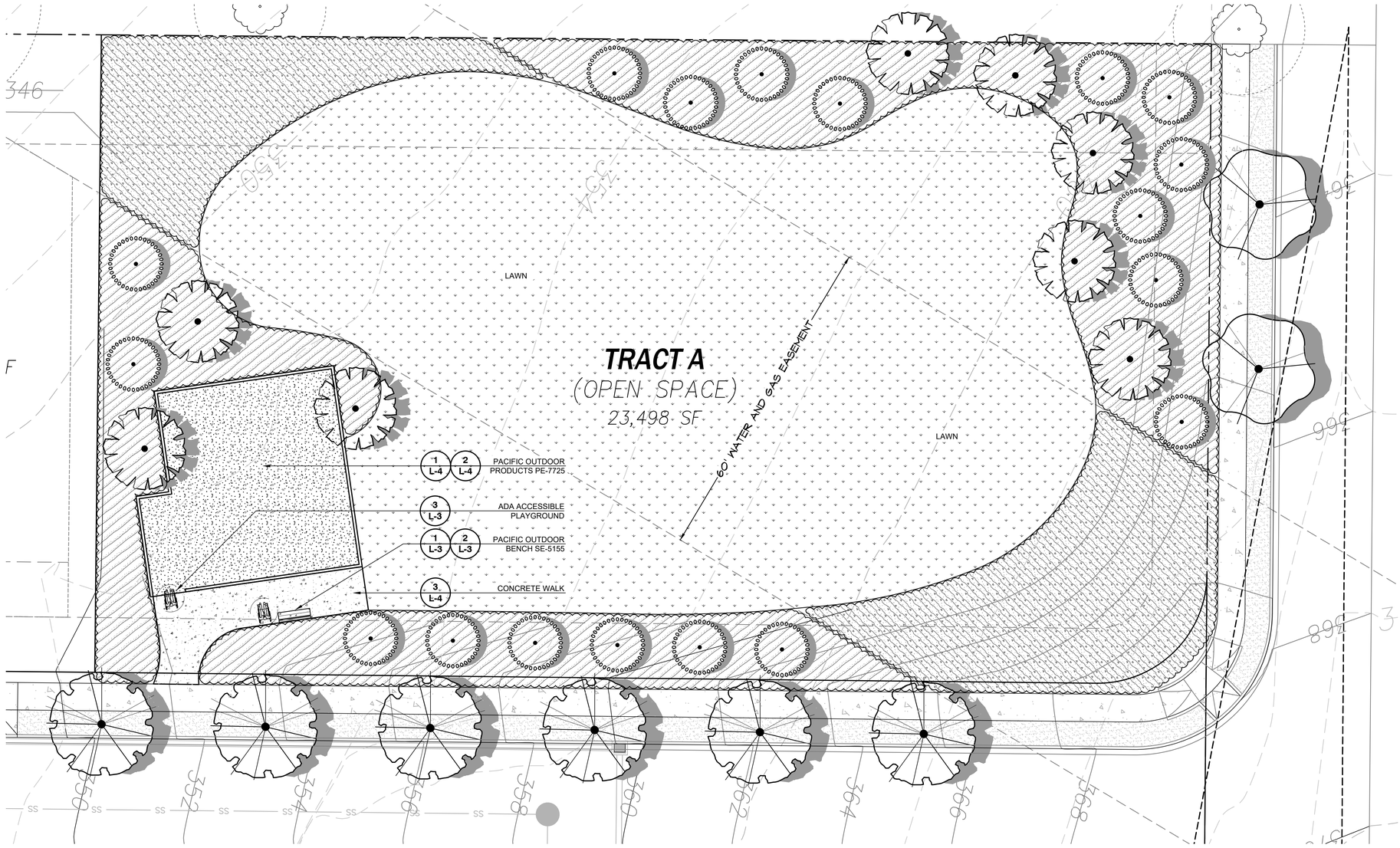
BELMONT TERRACE
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-2
OF 5 SHEETS

PTN. OF NE $\frac{1}{4}$ OF SEC 36, TWP 28 N, R6E W.M.

IRRIGATION PLAN NOTE:

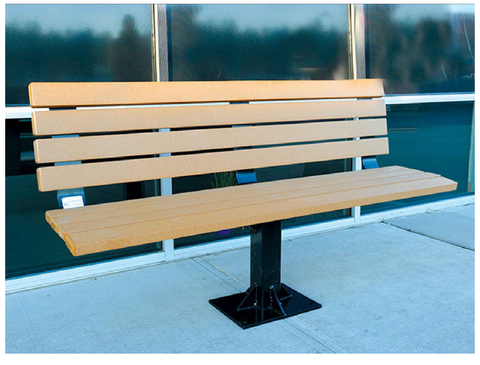
PARK AND OTHER MAINTAINED LANDSCAPE AREAS WITHIN THE PROJECT, INCLUDING PLANTER STRIP AREAS, SHALL BE IRRIGATED IN ACCORDANCE WITH APPLICABLE CITY OF MONROE MUNICIPAL CODE (MMC) AND PUBLIC WORKS STANDARDS. COMPLETE IRRIGATION PLANS AND SYSTEM DETAILS CONFORMING WITH THE PROVISIONS OF MMC 18.78.060 WILL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL WITH THE FINAL ENGINEERING PERMIT SUBMITTAL.



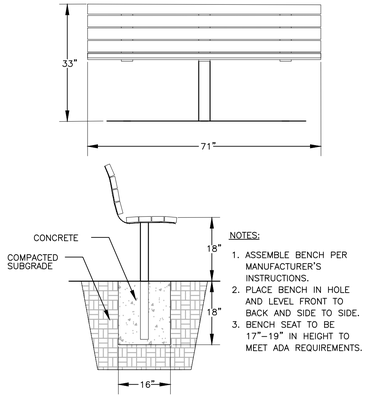
TRACT A LANDSCAPE PLAN
SCALE: 1" = 10' - 0"

GRAPHIC SCALE
-10 0 5 10 20
(IN FEET)
1 inch = 10 feet

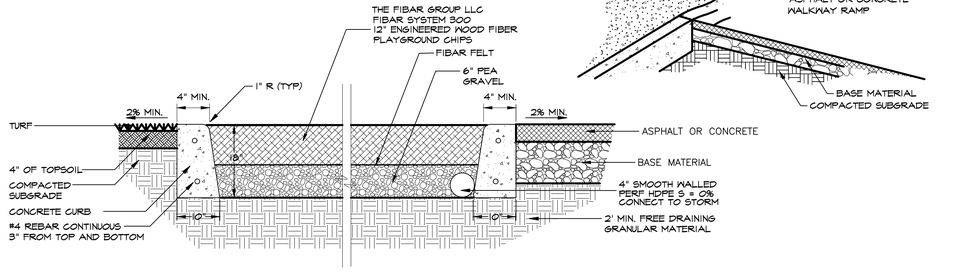
NOTE: BENCH TO BE MADE OF RECYCLED HDPE PLASTIC, POWDER COATED GREEN FRAME, & IN-GROUND MOUNTED



1 PACIFIC OUTDOOR BENCH SE-5155



2 IN-GROUND BENCH INSTALLATION
NTS



3 ADA ACCESSIBLE PLAYGROUND
NTS

Drawn: ELK
ELK
Created: 1/31/19
2. 5/14/19 REVISED PER COMMENTS

CRAMER DESIGN CONSULTANTS, INC.
LANDSCAPE ARCHITECT
1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
LOYD L. CRAMER
CERTIFICATE NO. 634

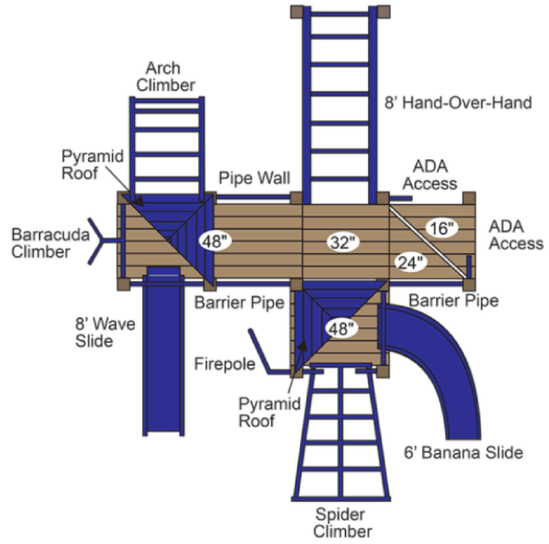
BELMONT TERRACE
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-3
OF 5 SHEETS

NOTE: PLAYGROUND EQUIPMENT TO BE MADE OF RECYCLED HDPE PLASTIC

AREA NEEDED: 32' X 36'
AGES 5–12
CAPACITY 34–42
ACTIVITIES 7

1 PACIFIC OUTDOOR PRODUCTS PE-7725



2 PACIFIC OUTDOOR PRODUCTS PE-7725 PLAN VIEW

IRRIGATION PLAN NOTE:

PARK AND OTHER MAINTAINED LANDSCAPE AREAS WITHIN THE PROJECT, INCLUDING PLANTER STRIP AREAS, SHALL BE IRRIGATED IN ACCORDANCE WITH APPLICABLE CITY OF MONROE MUNICIPAL CODE (MMC) AND PUBLIC WORKS STANDARDS. COMPLETE IRRIGATION PLANS AND SYSTEM DETAILS CONFORMING WITH THE PROVISIONS OF MMC 18.78.060 WILL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL WITH THE FINAL ENGINEERING PERMIT SUBMITTAL.

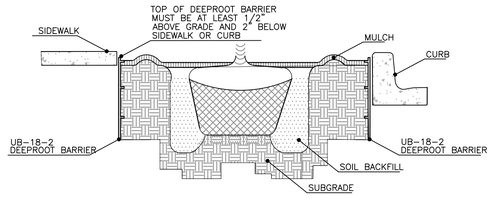
3 CONCRETE WALK
NTS

INSTALLATION SEQUENCE:

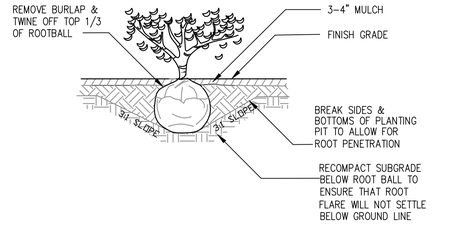
1. Prepare base and subgrade
2. Trench to appropriate depth for installation of root barrier so that top of barrier is 2" (5cm) below finish grade at top of curb.
3. Place root barrier in trench, vertical ribs must face toward tree roots.
4. Backfill and compact to requirements.

For additional information please visit our website at www.deeproot.com

For information regarding distributors please call: 1 800 ILV ROOT (458.7668). For help with drainage or other difficult installation questions please call DeepRoot Technical Support at: 1 800 ROOT TEK (768.8835).

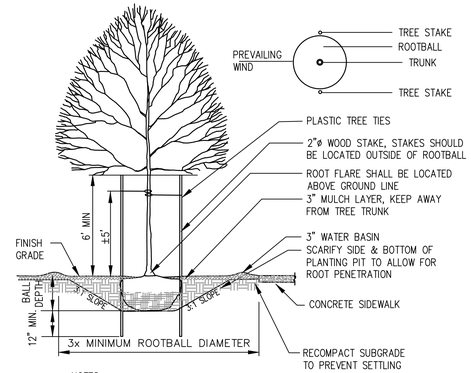


4 18" TREE ROOT BARRIER FOR PLANTING STRIP
NTS



5 TYPICAL SHRUB PLANTING DETAIL
NTS

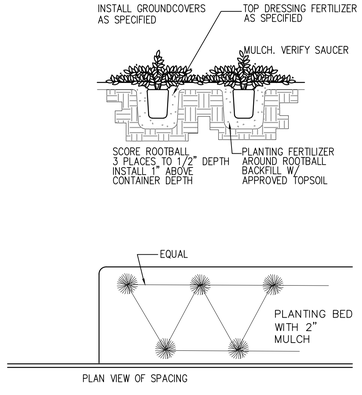
6 TYPICAL EVERGREEN TREE PLANTING DETAIL
NTS



NOTES:

1. TREE PIT SHALL NOT BE LESS THAN (3) TIMES ROOT BALL DIA.
2. CUT ALL TIES AND FOLD BACK BURLAP FROM UPPER 1/3 OF ROOT BALL
3. REMOVE ALL PLASTIC AND TWINE
4. TREE STAKES PERPENDICULAR TO THE PREVAILING WIND
5. PLANT TREES 2" HIGHER THAN DEPTH GROWN IN NURSERY

7 TYPICAL DECIDUOUS TREE PLANTING DETAIL
NTS



8 TYPICAL GROUNDCOVER PLANTING DETAIL
NTS

Created: 1/31/19
2. 5/14/19 REVISED PER COMMENTS
Drawn: ELK
ELK

CRAMER DESIGN CONSULTANTS, INC.
LANDSCAPE ARCHITECT
1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
LOYLE L. CRAMER
CERTIFICATE NO. 634

BELMONT TERRACE
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-4
OF 5 SHEETS

PLANT SCHEDULE 10' BUFFER

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Acer circinatum / Vine Maple	1.5"Cal		13
EVERGREEN TREES	**BOTANICAL NAME / COMMON NAME**	**SIZE**		**QTY**
	Thuja plicata 'Excelsa' / Excelsa Cedar	6'-8' Ht		7
SHRUBS	**BOTANICAL NAME / COMMON NAME**	**SIZE**		**QTY**
	Cornus sericea 'Elegantissima' / Variegated Redtwig Dogwood	18" Ht. min.		21
	Mahonia aquifolium 'Compacta' / Compact Oregon Grape	18" Ht. min.		25
	Polystichum munitum / Western Sword Fern	12" Ht. min.		46
	Symphoricarpos x 'Bokrabright' / Bright Fantasy Snowberry	18" Ht. min.		18
GROUND COVERS	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Arctostaphylos uva-ursi / Kinnikinnick	1 gal	36" o.c.	270

PLANT SCHEDULE STREET TREE & PLANTING STRIP

STREET TREE	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Pyrus calleryana 'Capital' / Capital Callery Pear	2"Cal		19
	Zelkova serrata 'Musashino' / Musashino Zelkova	2"Cal		6
LAWN	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Lawn	sod		3,986 sf

IRRIGATION PLAN NOTE:

PARK AND OTHER MAINTAINED LANDSCAPE AREAS WITHIN THE PROJECT,
INCLUDING PLANTER STRIP AREAS, SHALL BE IRRIGATED IN ACCORDANCE WITH APPLICABLE CITY OF MONROE MUNICIPAL CODE (MMC) AND PUBLIC WORKS STANDARDS. COMPLETE IRRIGATION PLANS AND SYSTEM DETAILS CONFORMING WITH THE PROVISIONS OF MMC 18.78.060 WILL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL WITH THE FINAL ENGINEERING PERMIT SUBMITTAL.

PLANT SCHEDULE TRACT A

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Cercidiphyllum japonicum / Katsura Tree	1.5"Cal		8
EVERGREEN TREES	**BOTANICAL NAME / COMMON NAME**	**SIZE**		**QTY**
	Thuja plicata 'Excelsa' / Excelsa Cedar	6'-8' Ht		18
LANDSCAPE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Groundcover Only	---		3,306 sf
	Shrubs and Groundcovers	---		6,166 sf
SEED	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Sun & Shade Lawn Blend JB Sod 70% Perennial Ryegrass 30% Fine Fescue Apply April - Oct with Irrigation 7 lbs per 1,000 sq ft	Hydroseed		12,650 sf
SITE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	12" Engineered Play Chips	N/A		1,260 sf

PLANT SCHEDULE TRACT B

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Acer rubrum 'Bowhall' / Bowhall Maple	1.5" Cal.		11
LANDSCAPE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Shrubs and Groundcovers	---		700 sf
LAWN	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Lawn	sod		2,320 sf

LANDSCAPE NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL OTHER SITE IMPROVEMENTS AND CONDITIONS PRIOR TO STARTING LANDSCAPE WORK.

2. CONTRACTOR SHALL USE CAUTION WHILE EXCAVATING TO AVOID DISTURBING ANY UTILITIES ENCOUNTERED. CONTRACTOR IS TO PROMPTLY ADVISE OWNER OF ANY DISTURBED UTILITIES. LOCATION SERVICE PHONE 1-800-424-5555.

3. CONTRACTOR SHALL MAINTAIN AND WATER ALL PLANT MATERIAL FOR 1 YEAR OR UNTIL FINAL INSPECTION AND ACCEPTANCE BY OWNER.

4. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING QUANTITIES OF PLANTS THAT ARE REPRESENTED BY SYMBOLS ON THE DRAWING.

5. SUBGRADE IS TO BE WITHIN ½ INCH OF 1 FOOT AS PROVIDED BY OTHERS. ALL PLANTING AREAS TO BE CLEARED OF ALL CONSTRUCTION MATERIAL AND ROCKS & STICKS LARGER THAN 2 INCH DIAMETER.

6. 4 INCH DEPTH TOPSOIL IN LANDSCAPE AREA.

7. 2 INCH DEPTH, 3 FOOT DIAMETER BARK RING AROUND BASE OF STREET TREES AND OTHER TREES LOCATED IN LAWN.

8. TREES SHOULD BE PLANTED SO THAT THE CENTER OF EACH TRUNK IS 3 FEET FROM THE BACK OF CURB OR IF PLANTED BEHIND A SIDEWALK 3 FEET FROM THE BACK OF A SIDEWALK WHERE TREES ARE TO BE PLANTED ADJACENT TO A SIDEWALK.

9. GROUND COVERS SHALL BE PLANTED IN AN EQUILATERAL TRIANGULAR SPACING PATTERN AT THE ON-CENTER DISTANCES SHOWN ON THE PLAN OR IN THE PLANT SCHEDULE. WHERE GROUND COVER ABUTS CURBING, SIDEWALKS, SIGNS OR POLES, MINIMUM PLANTING DISTANCES SHALL BE 12" FROM CENTER OF PLANT TO CURB, SIDEWALK, ETC. MINIMUM PLANTING DISTANCE SHALL BE 24" FROM CENTER OF TREES AND SHRUBS.

10. ALL PLANT MATERIAL SHALL BE FERTILIZED WITH AGRO TRANSPLANT FERTILIZER 4-2-2 PER MANUFACTURERS SPECIFICATIONS.

11. ALL PLANT MATERIAL SHALL CONFORM TO AAN STANDARDS FOR NURSERY STOCK LATEST EDITION. ALL PLANT MATERIAL FURNISHED SHALL BE HEALTHY REPRESENTATIVES, TYPICAL OF THEIR SPECIES OF VARIETY AND SHALL HAVE A NORMAL GROWTH HABIT. THEY SHALL BE FULL, WELL BRANCHED, WELL PROPORTIONED, AND HAVE A VIGOROUS, WELL DEVELOPED ROOT SYSTEM. ALL PLANTS SHALL BE HARDY UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT. TREES, SHRUBS AND GROUNDCOVER QUANTITIES, SPECIES, VARIETIES, SIZES AND CONDITIONS TO BE AS SHOWN ON THE PLANTING PLAN. PLANTS TO BE FREE OF DISEASE, INJURY, INSECTS, DECAY, HARMFUL DEFECTS AND ALL WEEDS. NO SUBSTITUTIONS SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM LANDSCAPE ARCHITECT OR OWNER.

12. IRRIGATION PLANS FOR PARK AND MAINTAINED LANDSCAPE AREAS, INCLUDING PLANTER STRIP AREAS, WILL BE PROVIDED WITH FINAL ENGINEERING REVIEW PLAN SET FOR CITY REVIEW AND APPROVAL (SEE LANDSCAPE PLAN NOTE).

13. TREES TO BE PLANTED MINIMUM 5 FEET FROM PROJECT BOUNDARIES.

14. THE AVERAGE SPACING FOR STREET TREES SHOULD BE 30 FEET ON CENTER AND ADJUSTED TO ALLOW FOR SIGHT LINES, UTILITIES, TRAFFIC SIGNS, LIGHT STANDARDS, DRIVEWAYS AND OTHER STREET APPURTENANCES.

15. DO NOT PLANT STREET TREES WITHIN TWENTY FEET OF STREET LIGHTS.

16. LANDSCAPING SHALL BE PLANTED AND MAINTAINED IN A MANNER SO AS TO PROVIDE 36" CLEARANCE AROUND THE CIRCUMFERENCE OF FIRE HYDRANTS.

17. PROVIDE UB-18-2 DEEP ROOT BARRIER ADJACENT TO SIDEWALK AND CURB WITHIN PLANTER STRIPS. PROVIDE ROOT BARRIER BETWEEN TREE AND DRIVEWAY APRONS, WATER METERS AND FIRE HYDRANTS WHERE DISTANCE IS LESS THAN 8'. ROOT BARRIER IS TO BE 16' IN LENGTH WITH TREE CENTERED ON THIS LENGTH.

Drawn: ELK
ELK
Created: 1/31/19
2. 5/14/19 REVISED PER COMMENTS

CRAMER DESIGN CONSULTANTS, INC.
LANDSCAPE ARCHITECT
1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
KYLE L. CRAMER
CERTIFICATE NO. 634

BELMONT TERRACE
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-5
OF 5 SHEETS

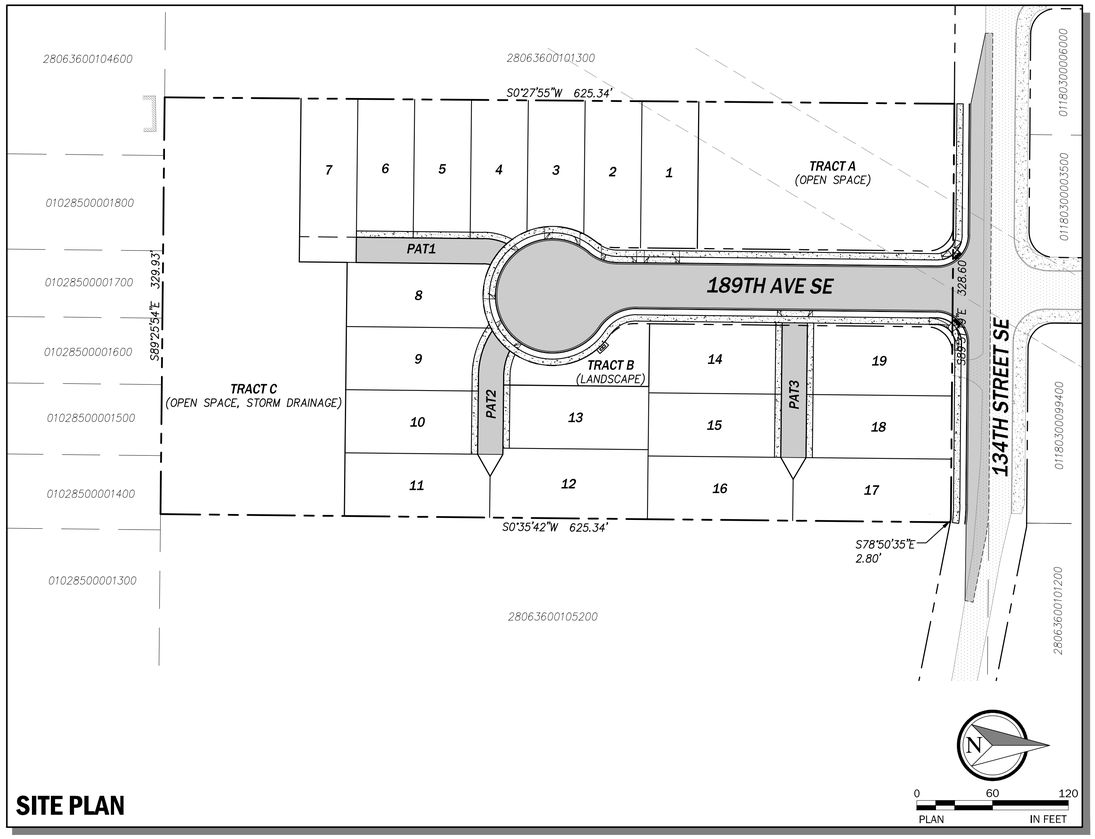
PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.

BELMONT TERRACE PRD

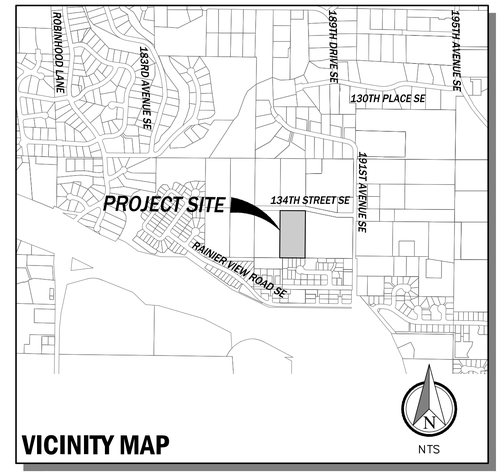
PRELIMINARY SUBDIVISION AND PRD APPLICATION
MAY 13, 2019

CITY OF MONROE — SNOHOMISH COUNTY, WA

RECEIVED
05/14/2019
CITY OF MONROE



SITE PLAN



VICINITY MAP

SURVEY DATA

EXISTING BOUNDARY, TOPOGRAPHIC, AND PLANIMETRIC INFORMATION SHOWN ON THIS PLAN AND OTHERS IN THIS SET WERE USED AS A BASIS FOR DESIGN AND REPRESENT FIELD SURVEY DATA AND MAPPING PREPARED BY LDC, AS PROVIDED BY THE PROJECT OWNER, AND DOES NOT REPRESENT WORK BY CPH CONSULTANTS. THE FOLLOWING SURVEY DATA WAS PROVIDED WITH THE TOPOGRAPHIC MAP BY LDC:

LEGAL DESCRIPTION
CHICAGO TITLE INSURANCE COMPANY
COMMITMENT NO. 500076500
COMMITMENT DATE: SEPTEMBER 14, 2018 AT 08:00 AM

TRACT 2 OF SNOHOMISH COUNTY LARGE TRACT SEGREGATION 31(7-80) RECORDED UNDER AUDITOR'S FILE NO. 8103090166, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, BEING A PORTION OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 36, TOWNSHIP 28 NORTH, RANGE 6 EAST OF THE WILLAMETTE MERIDIAN.

SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

VERTICAL DATUM

NORTH AMERICAN VERTICAL DATUM–1988

HORIZONTAL DATUM

NAD 83/91
WASHINGTON STATE COORDINATES–NORTH ZONE

BASIS OF BEARING

NAD83/91 FROM GPS OBSERVATION
MONUMENTED NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 36 AS SHOWN HEREON (BEARING = N 89°36'44" W)

SITE TBM

PROJECT BENCHMARK:
SET MAG NAIL IN CONCRETE CURB JOINT AS SHOWN HEREON
FOUND ELEVATION = 372.31 FEET

REFERENCES

(R1) RECORD OF SURVEY RECORDED UNDER AUDITOR'S FILE NO. 7802060255

(R2) PLAT OF TROMBLEY HILL RECORDED UNDER AUDITOR'S FILE NO. 9812155001

(R3) SNOHOMISH COUNTY LARGE TRACT SEGREGATION 31(7–80) RECORDED UNDER AUDITOR'S FILE NO. 8103090166

(C) CALCULATED

(M) MEASURED

EQUIPMENT AND PROCEDURES

METHOD OF SURVEY:
SURVEY PERFORMED BY FIELD TRAVERSE
INSTRUMENTATION:
LEICA MS–50 ROBOTIC TOTAL STATION WITH DATA COLLECTOR AND LEICA GS–14 GPS MAINTAINED IN ADJUSTMENT TO MANUFACTURES SPECIFICATIONS AS REQUIRED BY WAC 332–130–100
PRECISION:
MEETS OR EXCEEDS STATE STANDARDS WAC 332–130–090

SURVEY NOTES

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PROJECT INFORMATION

GENERAL	
PARCEL NO.:	*28063600101900*
SITE ADDRESS:	*18830 134TH ST SE*
	MONROE, WA 98272-9753
EXISTING ZONING:	*UR9600*
SITE DEVELOPMENT	
TOTAL SITE AREA	*4.75 AC*
TOTAL DEVELOPABLE AREA	*4.75 AC*
UNDISTURBED AREA	*0.00 AC*
IMPERVIOUS AREAS:	
BUILDINGS AND DRIVEWAYS	*1.45 AC*
ROADWAY AND SIDEWALKS	*2.31 AC*
POND SURFACE	*0.41 AC*
PERVIOUS AREAS:	
PLANTER STRIP LANDSCAPING	*0.07 AC*
PARK AND YARD LANDSCAPING	*1.96 AC*
ALLOWABLE RESIDENTIAL DENSITY:	
ALLOWABLE BASE DENISTY	*4.75 AC x 3.63 DU/AC = 17 LOTS*
PRD DENSITY BONUS	*0.30 x 17 = 5 LOTS*
TOTAL ALLOWABLE UNITS	*22 LOTS*
PROPOSED NO. LOTS	*19 LOTS*
MINIMUM LOT SIZE	*4,562 SF*
MINIMUM LOT WIDTH	*45 FT*
MAX LOT COVERAGE	*60%*
RESIDENTIAL LOT MIX (MMC 18.84.080.0)	*0% ≤ 4,000 SF*
	21% 4,001 TO 5,000 SF
	79% > 5,000 SF
BUILDING SETBACKS	*10 FT - FRONT*
	20 FT - GARAGE
	10 FT - REAR
	5 FT - SIDE

PARK AND RECREATION OPEN SPACE

MINIMUM REQUIRED (975 SF/LOT x BASE DENSITY): 975 x 17 = 16,575 SF
PARK AND RECREATION OPEN SPACE PROVIDED:

TRACT A	*23,498 SF*
TOTAL	*23,498 SF*

UTILITY PURVEYORS

WATER	*CITY OF MONROE*
SANITARY SEWER	*CITY OF MONROE*
STORM DRAINAGE	*CITY OF MONROE*
FIRE DISTRICT	*SNOHOMISH COUNTY FIRE DISTRICT NO. 7*
SCHOOL DISTRICT	*MONROE SCHOOL DISTRICT NO. 103*
POWER	*SNOHOMISH CO. PUD*
NATURAL GAS	*PUGET SOUND ENERGY*
EXIST. GAS TRANSMISSION LINE	*WILLIAMS - NORTHWEST PIPELINE*

PROJECT TEAM

OWNER
MATEO & BELLA BARAJAS
21020 CALHOUN RD
MONROE, WA 98272
PHONE: (425) 239-8462

APPLICANT
SSHI, LLC dba D.R. HORTON
CONTACT: JENNIFER REINER
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

CIVIL ENGINEER/PLANNER
CPH CONSULTANTS
CONTACT: MATT HOUGH, PE
11431 WILLOWS ROAD NE, SUITE 120
REDMOND, WA 98052
PHONE: (425) 285-2390
FAX: (425) 285-2389

SURVEYOR
LDC
CONTACT: MICHAEL MERRITT, PLS
20210 142ND AVENUE NE
WOODINVILLE, WA 98072
PHONE: (425) 806-1869

LANDSCAPE ARCHITECT
CRAMER DESIGN CONSULTANTS
CONTACT: GAYLE CRAMER, RLA
1909 242ND STREET SE
BOTHELL, WA 98021
PHONE: (425) 241-6258

GEOTECHNICAL ENGINEER
TERRA ASSOCIATES, INC.
CONTACT: CAROLYN DECKER, PE
12220 113TH AVENUE NE
KIRKLAND, WA 98034
PHONE: (425) 821-7777

TRAFFIC ENGINEER
GIBSON TRAFFIC, INC
CONTACT: BRAD LINCOLN, PE
2802 WETMORE AVENUE, SUITE 220
EVERETT, WA 98201
PHONE: (425) 339-8266

DRAWING INDEX

SHEET	*DWG*	*DESCRIPTION*
1	*P0.00*	*COVER*
2	*P0.10*	*EXISTING CONDITIONS*
3	*P1.00*	*PRELIMINARY CLEARING AND TESC PLAN*
4	*P2.00*	*PRELIMINARY SUBDIVISON AND PRD SITE PLAN*
5	*P2.10*	*TYPICAL ROADWAY SECTIONS*
6	*P3.00*	*PRELIMINARY GRADING PLAN*
7	*P3.01*	*PRELIMINARY STORM DRAINAGE PLAN*
8	*P3.05*	*FRONTAGE ROADWAY IMPROVMENTS*
9	*P3.10*	*PRELIMINARY ROAD PROFILES*
10	*P3.11*	*PRELIMINARY ROAD PROFILES*
11	*P3.20*	*STORM POND PLAN AND SECTIONS*
12	*P6.00*	*PRELIMINARY UTILITY PLAN*
13	*P7.00*	*PARK, RECREATION AND OPEN SPACE PLAN*
14	*L-1*	*LANDSCAPE PLAN*
15	*L-2*	*LANDSCAPE PLAN*
16	*L-3*	*LANDSCAPE PLAN*
17	*L-4*	*LANDSCAPE PLAN*
18	*L-5*	*LANDSCAPE PLAN*

811
Know what's **below.**
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CPH CONSULTANTS
Site Planning • Civil Engineering
Land Use Consulting • Project Management
11431 Willows Rd. NE, Suite 120
Redmond, WA 98052
Phone: (425) 285-2390 | FAX: (425) 285-2389
www.cphconsultants.com

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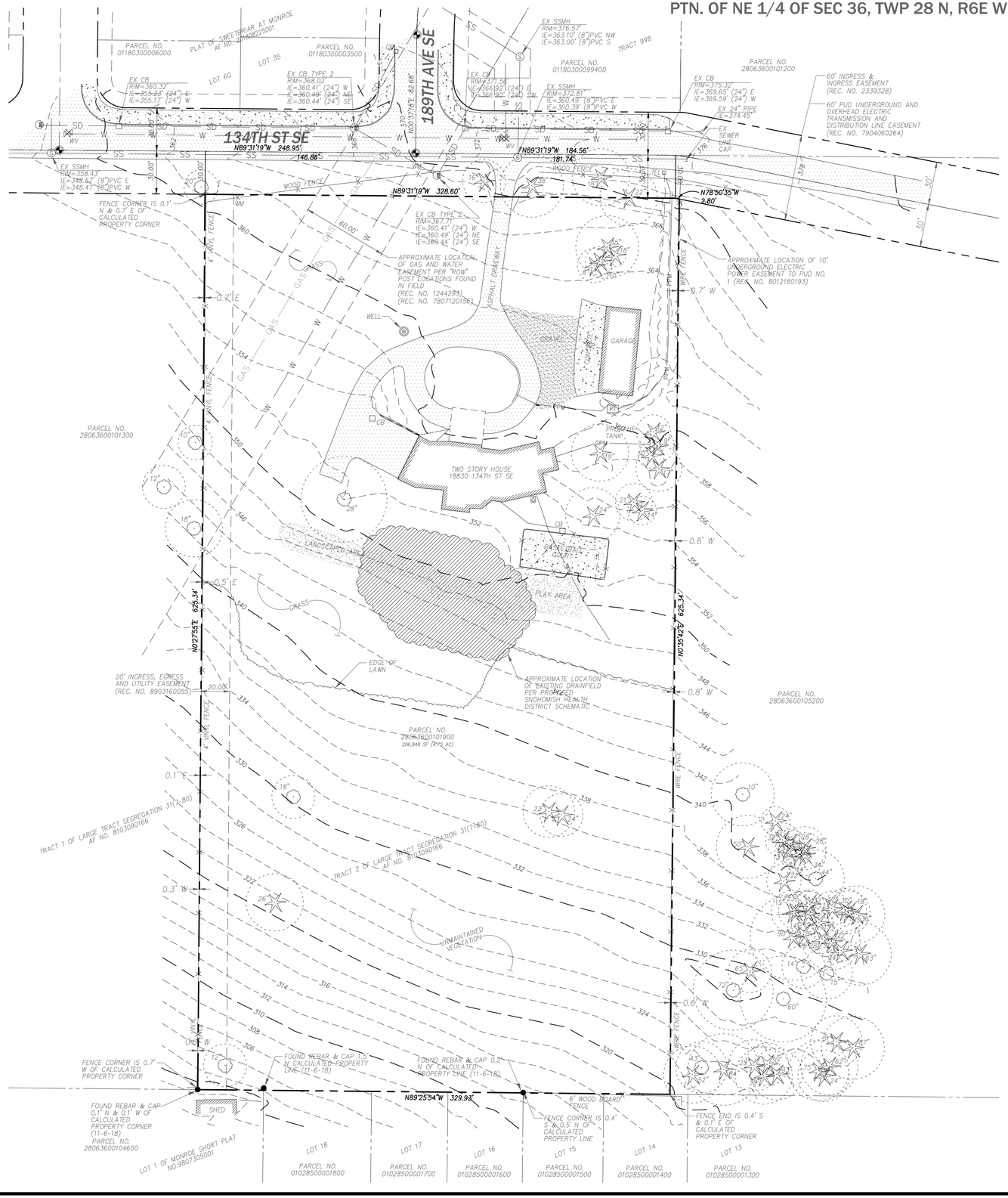
5/13/2019 1:15 PM CASEY TORRES



SURVEY DATA

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LEGAL DESCRIPTION

TRACT 2 OF SNOHOMISH COUNTY LARGE TRACT SEGREGATION 31(7-80) RECORDED UNDER AUDITOR'S FILE NO. 8103090166, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, BEING A PORTION OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 36, TOWNSHIP 28 NORTH, RANGE 6 EAST OF THE WILLAMETTE MERIDIAN.

SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

VERTICAL DATUM

NORTH AMERICAN VERTICAL DATUM–1988

HORIZONTAL DATUM

NAD 83/91
WASHINGTON STATE COORDINATES–NORTH ZONE

BASIS OF BEARING

NAD83/91 FROM GPS OBSERVATION
MONUMENTED NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 36 AS SHOWN HEREON (BEARING = N 89°36'44" W)

SITE TBM

PROJECT BENCHMARK:
SET MAG NAIL IN CONCRETE CURB JOINT AS SHOWN HEREON
FOUND ELEVATION = 372.31 FEET

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METHOD OF SURVEY:
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NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HERRON — STATE OF WASHINGTON — 36081 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

EXISTING CONDITIONS

CITY OF MONROE — SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

CP|H CONSULTANTS
Site Planning • Civil Engineering
Land Use Consulting • Project Management
11431 Willows Rd. NE, Suite 120
Redmond, WA 98052
Phone: (425) 285-2390 | FAX: (425) 285-2389
www.cphconsultants.com

PROJECT NO. 0035-18-27

DRAWING P0.10

SHEET 2 OF 18

0 40 80
PLAN IN FEET

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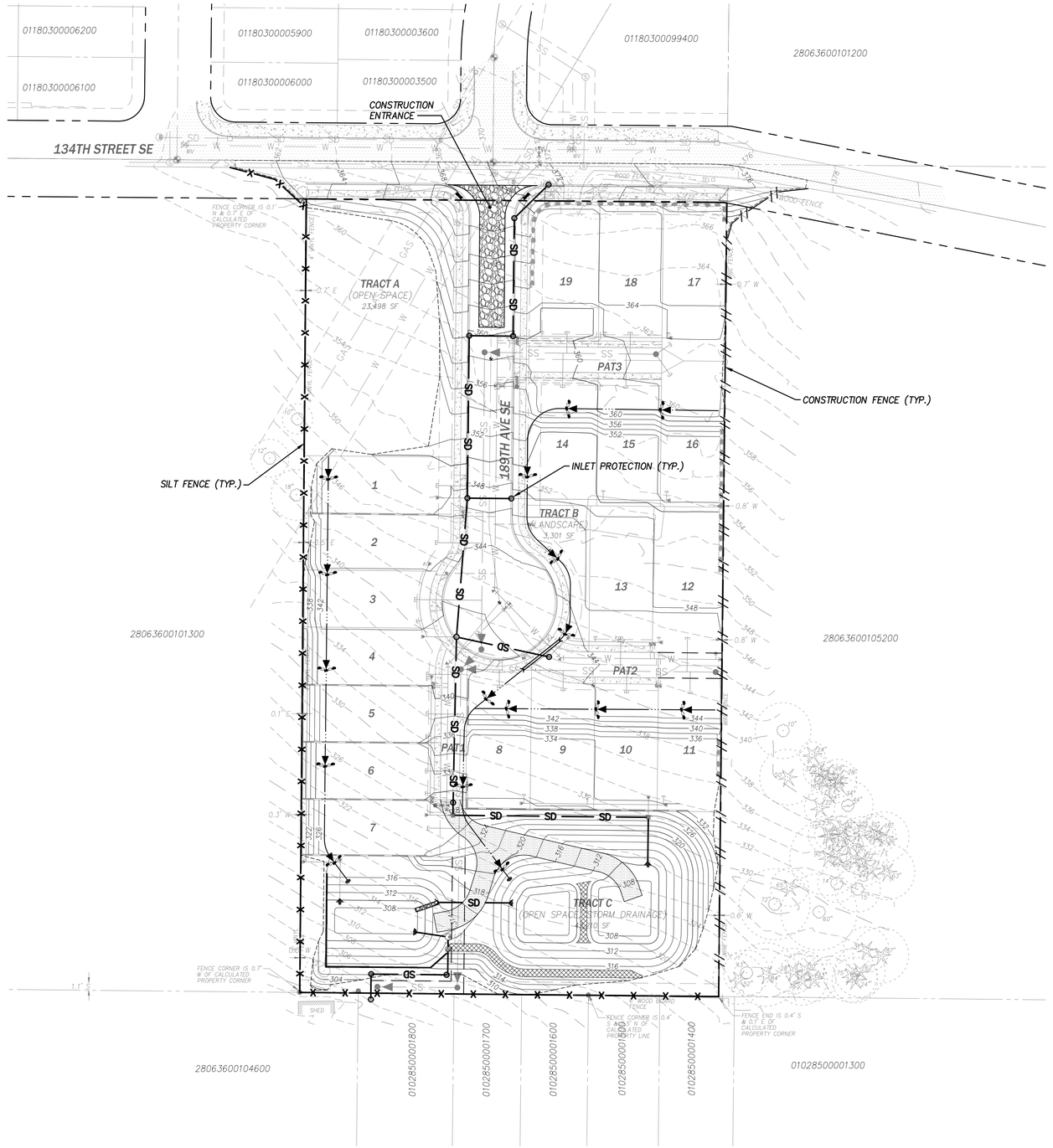
5/13/2019 3:15 PM CASEY TORRES

PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.



LEGEND

- APPROX. LIMIT OF GRADING
- SILT FENCE
- CONSTRUCTION FENCE
- TEMPORARY INTERCEPTOR DITCH WITH ROCK CHECK DAM
- SD — PERMANENT STORM DRAIN PIPE
- TYPE 1 CATCH BASIN W/STANDARD GRATE
- TYPE 2 CATCH BASIN W/STANDARD GRATE
- STORM DRAINAGE PROTECTION INSERT
- CONSTRUCTION ENTRANCE

NOTE:

1. THE TEMPORARY EROSION AND SEDIMENT CONTROL FACILITIES SHOWN ON THIS PLAN ILLUSTRATE THE MINIMUM AND TYPICAL BMPs NECESSARY. ADDITIONAL FACILITIES AND SPECIFICATIONS WILL BE PROVIDED WITH THE FINAL ENGINEERING DESIGN AND CONSTRUCTION PLANS FOR THE PROJECT.
2. ANY EXISTING DOMESTIC WATER WELLS LOCATED ON-SITE SHALL BE ABANDONED AND DECOMMISSIONED IN ACCORDANCE WITH DEPARTMENT OF ECOLOGY STANDARDS.
3. EXISTING PRIVATE SEPTIC TANKS AND DRAINFIELDS ON THE SITE SHALL BE ABANDONED IN ACCORDANCE WITH SNOHOMISH COUNTY DEPARTMENT OF HEALTH STANDARDS.
4. A SEPARATE DEMOLITION PERMIT WILL REMOVE ALL EXISTING ON-SITE STRUCTURES.

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDRICK — STATE OF WASHINGTON — 36081 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY CLEARING AND TESC PLAN

CITY OF MONROE — SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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PROJECT NO.
0035-18-27

DRAWING
P1.00

SHEET 3 OF 18

0 50 100
PLAN IN FEET

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5/13/2019 3:45 PM CASEY TORRES

PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.

PROJECT INFORMATION

GENERAL	
PARCEL NO.:	28063600101900
SITE ADDRESS:	18830 134TH ST SE MONROE, WA 98272-9753
EXISTING ZONING:	UR9600
SITE DEVELOPMENT	
TOTAL SITE AREA	4.75 AC
TOTAL DEVELOPABLE AREA	4.75 AC
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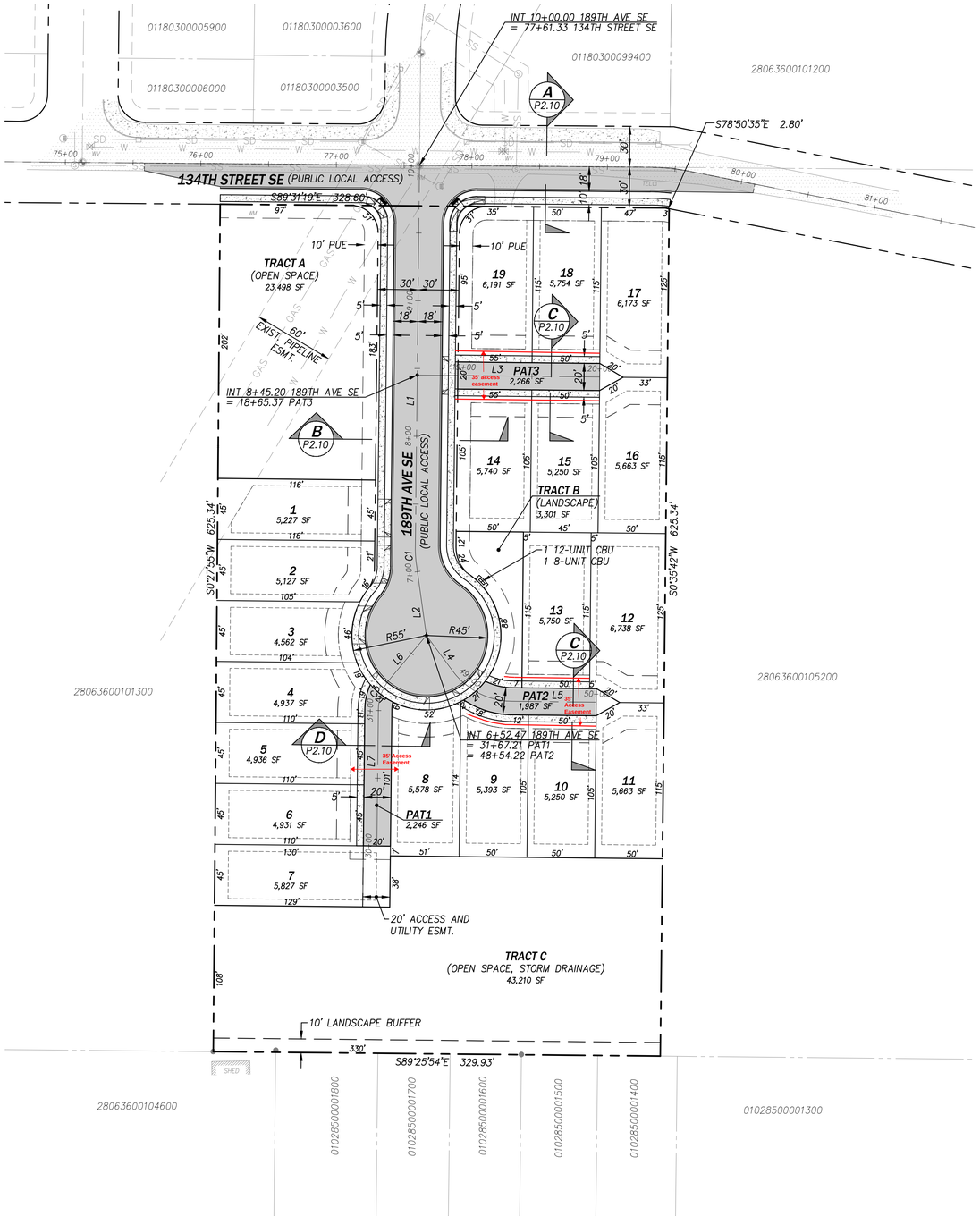
STORM DRAINAGE	CITY OF MONROE
FIRE DISTRICT	SNOHOMISH COUNTY FIRE DISTRICT NO. 7
SCHOOL DISTRICT	MONROE SCHOOL DISTRICT NO. 103
POWER	SNOHOMISH CO. PUD
NATURAL GAS	PUGET SOUND ENERGY
EXIST. GAS TRANSMISSION LINE	WILLIAMS - NORTHWEST PIPELINE

ROADWAY ALIGNMENT AND TRACT DATA

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	284.18'	N0°37'18"E
L2	125.41'	N7°57'29"W
L3	180.00'	S89°22'42"E
L4	57.70'	S36°27'59"E
L5	111.57'	S89°22'42"E
L6	67.48'	N39°56'19"E
L7	125.72'	N0°37'18"E

CURVE TABLE			
CURVE #	Δ	RADIUS	LENGTH
C1	N3°40'06"W	53.00'	7.94'
C2	S62°55'20"E	55.00'	50.79'
C3	N20°16'49"E	35.00'	24.02'

NOTE:
EACH PRIVATE ACCESS TRACT SHALL BE DESIGNATED AS A FIRE LANE AND INCLUDE APPROPRIATE SIGNAGE.



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COMMITMENT NO. 500076500
COMMITMENT DATE: SEPTEMBER 14, 2018 AT 08:00 AM

TRACT 2 OF SNOHOMISH COUNTY LARGE TRACT SEGREGATION 31(7-80) RECORDED UNDER AUDITOR'S FILE NO. 8103090166, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, BEING A PORTION OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 36, TOWNSHIP 28 NORTH, RANGE 6 EAST OF THE WILLAMETTE MERIDIAN.

SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

VERTICAL DATUM

NORTH AMERICAN VERTICAL DATUM–1988

HORIZONTAL DATUM

NAD 83/91
WASHINGTON STATE COORDINATES–NORTH ZONE

BASIS OF BEARING

NAD83/91 FROM GPS OBSERVATION
MONUMENTED NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 36 AS SHOWN HEREON (BEARING = N 89°36'44" W)

SITE TBM

PROJECT BENCHMARK:
SET MAG NAIL IN CONCRETE CURB JOINT AS SHOWN HEREON
FOUND ELEVATION = 372.31 FEET

REFERENCES

(R1) RECORD OF SURVEY RECORDED UNDER AUDITOR'S FILE NO. 7802060255

(R2) PLAT OF TROMBLEY HILL RECORDED UNDER AUDITOR'S FILE NO. 9812155001

(R3) SNOHOMISH COUNTY LARGE TRACT SEGREGATION 31(7–80) RECORDED UNDER AUDITOR'S FILE NO. 8103090166

(C) CALCULATED

(M) MEASURED

EQUIPMENT AND PROCEDURES

METHOD OF SURVEY:
SURVEY PERFORMED BY FIELD TRAVERSE
INSTRUMENTATION:
LEICA MS–50 ROBOTIC TOTAL STATION WITH DATA COLLECTOR AND LEICA GS–14 GPS MAINTAINED IN ADJUSTMENT TO MANUFACTURES SPECIFICATIONS AS REQUIRED BY WAC 332–130–100
PRECISION:
MEETS OR EXCEEDS STATE STANDARDS WAC 332–130–090

SURVEY NOTES

THIS SURVEY HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF PARTIES WHOSE NAMES APPEAR HEREON ONLY, AND DOES NOT EXTEND TO ANY UNNAMED THIRD PARTIES WITHOUT EXPRESS RECERTIFICATION BY THE LAND SURVEYOR.

BOUNDARY LINES SHOWN AND CORNERS SET REPRESENT DEED LOCATIONS; OWNERSHIP LINES MAY VARY. NO GUARANTEE OF OWNERSHIP IS EXPRESSED OR IMPLIED. THIS SURVEY WAS PERFORMED WITH THE BENEFIT OF A TITLE REPORT FROM CHICAGO TITLE INSURANCE COMPANY (COMMITMENT NO. 500076500 / COMMITMENT DATE: SEPTEMBER 14, 2018 AT 08:00 AM).

0 50 100
PLAN IN FEET

Know what's below. Call before you dig.

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDGE — STATE OF WASHINGTON — 36081 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY SUBDIVISON AND PRD SITE PLAN

SNOHOMISH COUNTY, WA

CITY OF MONROE

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

CPH CONSULTANTS
Site Planning • Civil Engineering
Land Use Consulting • Project Management
11431 Willows Rd. NE, Suite 120
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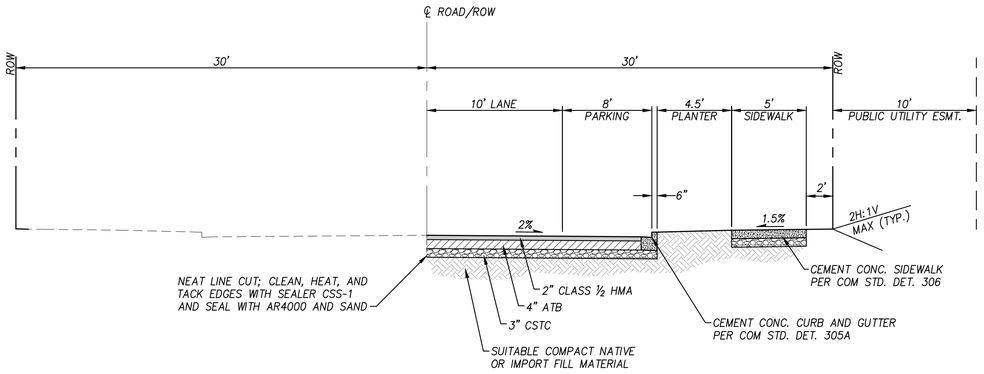
PROJECT NO.
0035-18-27

DRAWING
P2.00

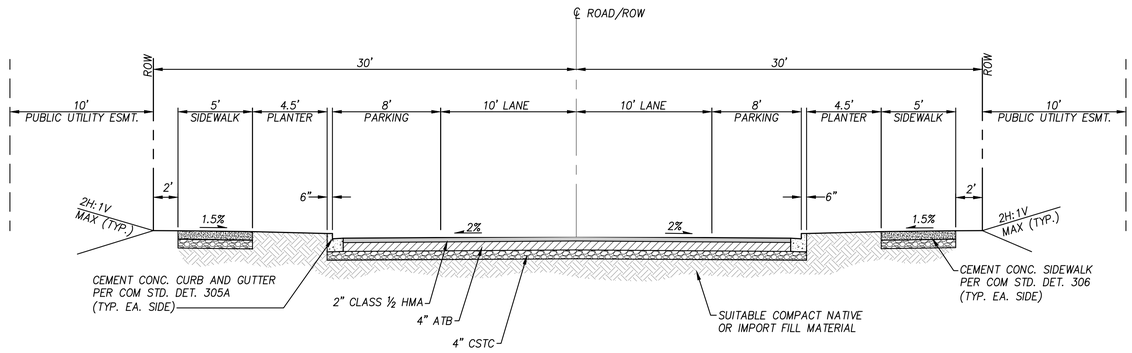
SHEET 4 OF 18

P:\project\0035\18027\Dwg\Sheets\Preliminary Plat\P2.00.dwg
5/13/2019 3:41 PM CASEY TORRES



A P2.00 **TYPICAL ROAD SECTION - 134TH STREET SE**

NOT TO SCALE (LOCAL ACCESS)



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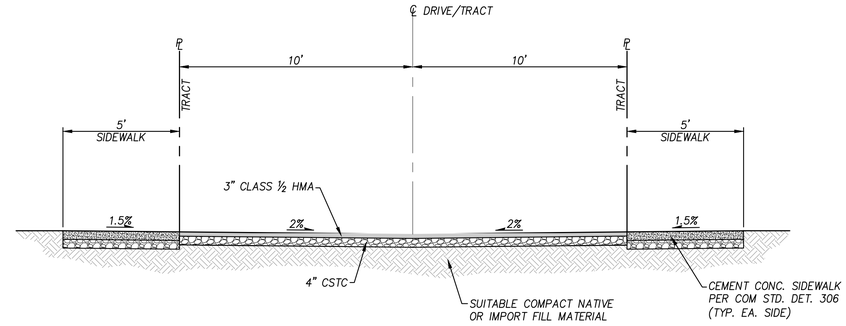

C P2.00 **TYPICAL SECTION - PAT2 AND PAT3**

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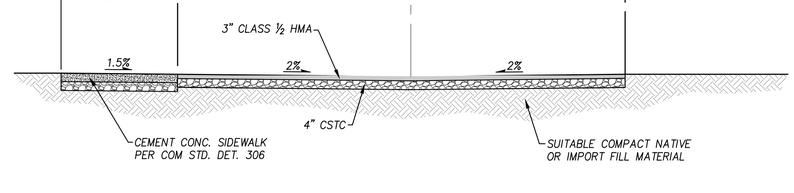

D P2.00 **TYPICAL SECTION - PAT1**

NOT TO SCALE (PRIVATE ACCESS)

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDGE — STATE OF WASHINGTON — 36081 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

TYPICAL ROADWAY SECTIONS

CITY OF MONROE — SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

CP|H CONSULTANTS
Site Planning • Civil Engineering
Land Use Consulting • Project Management
11431 Willows Rd. NE, Suite 120
Redmond, WA 98052
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www.cphconsultants.com

PROJECT NO. 0035-18-27

DRAWING P2.10

SHEET 5 OF 18

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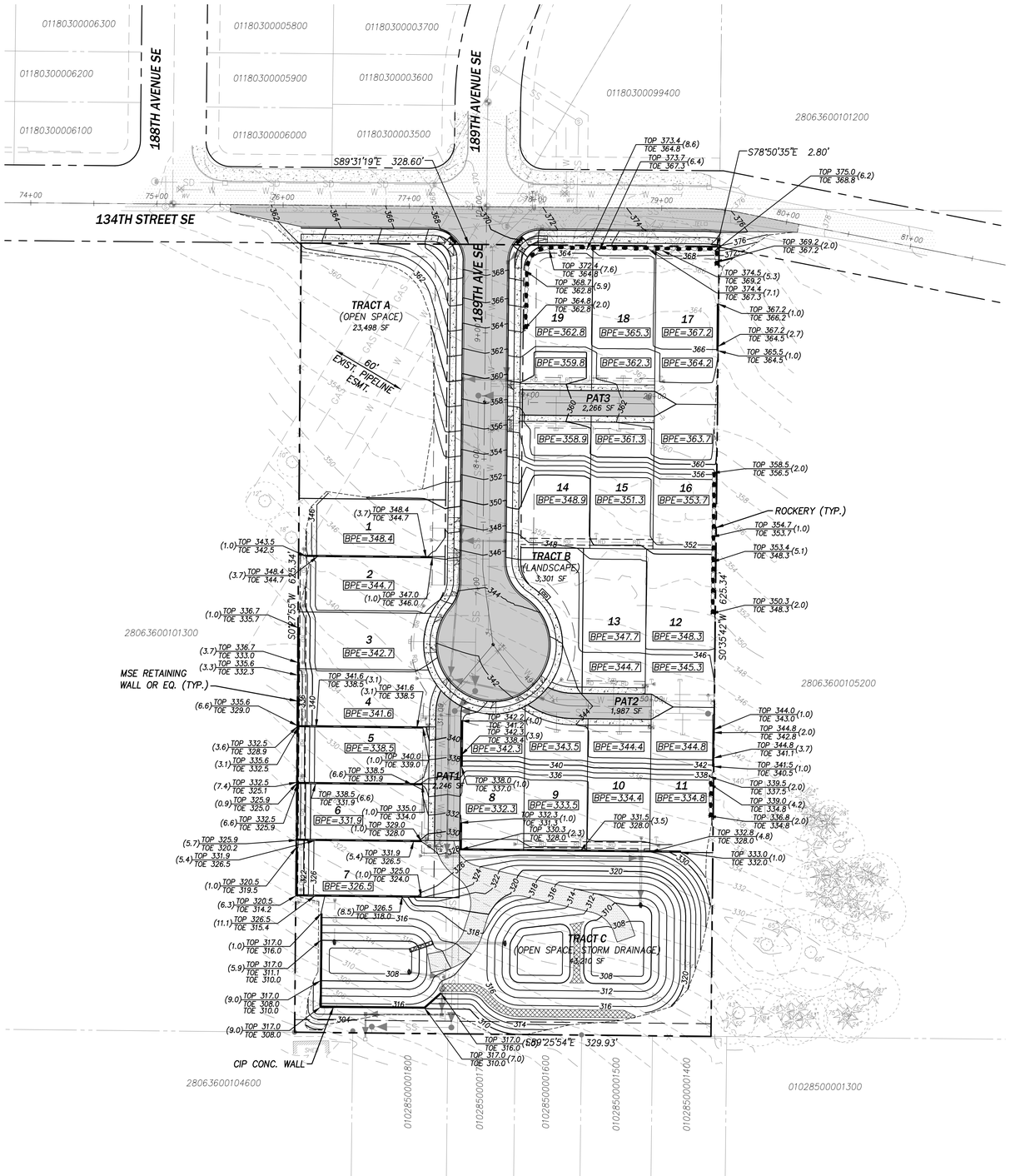
PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.



LEGEND

- MSE RETAINING WALL
- ROCKERY
- GRADE BREAK
- APPROX. LIMITS OF GRADING
- BPE=500.00 — BEARING PAD ELEVATION
- 160 — EXIST. TOPOGRAPHIC CONTOUR
- 160 — PROPOSED GRADE CONTOUR
- TYPE 1 STORM DRAINAGE CATCH BASIN
- TYPE 2 STORM DRAINAGE CATCH BASIN
- SD — STORM DRAINAGE PIPE
- TOP 246 / TOE 242 (4) — FINISHED GRADE AT TOP/TOE OF WALL

APPROXIMATE EARTHWORK QUANTITIES

THE FOLLOWING EARTHWORK QUANTITIES ARE APPROXIMATE BASED ON PRELIMINARY FINISHED DESIGN GRADES AND ARE PROVIDED TO ILLUSTRATE THE GENERAL EARTHWORK EFFORTS FOR THE PROJECT EXCLUDING VOLUMES PAVEMENT SECTIONS AND TRENCH DISPLACEMENT:

8" STRIPPING:	4,597 CY
CUT:	10,845 CY
FILL:	12,154 CY
NET (FILL):	1,300 CY

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDGE — STATE OF WASHINGTON — 36067 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY GRADING PLAN

CITY OF MONROE — SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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PROJECT NO. 0035-18-27

DRAWING P3.00

SHEET 6 OF 18

0 50 100
PLAN IN FEET

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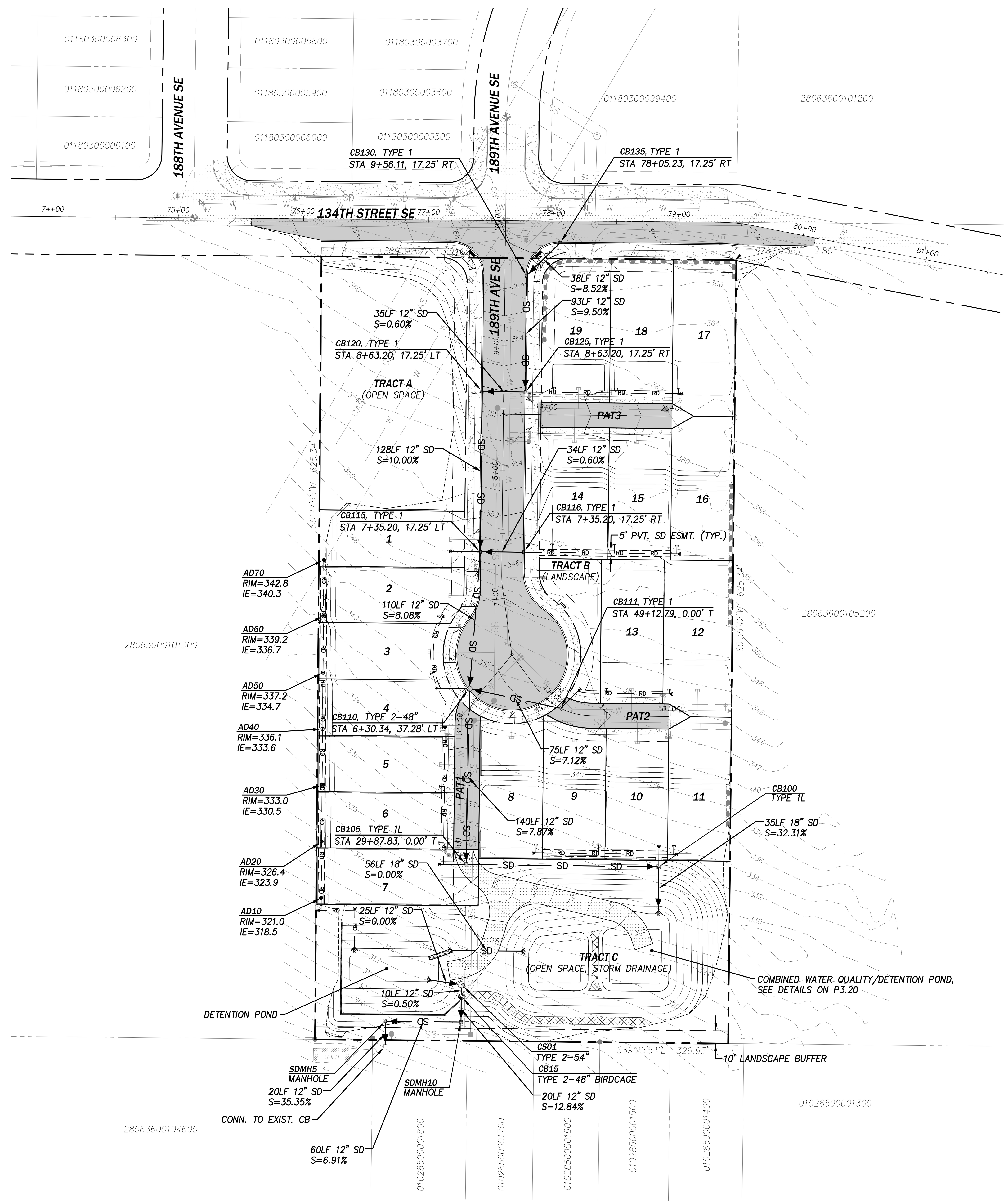
5/13/2019 3:47 PM CASEY TORRES

PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.



LEGEND

	MSE RETAINING WALL
	ROCKERY
—160—	EXIST. TOPOGRAPHIC CONTOUR
—160—	PROPOSED GRADE CONTOUR
	TYPE 1 STORM DRAINAGE CATCH BASIN
	TYPE 2 STORM DRAINAGE CATCH BASIN
	YARD DRAIN
— SD —	STORM DRAINAGE PIPE
— RD — RD —	ROOF DRAIN CONNECTION

0 50 100
PLAN IN FEET

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NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HOUGH, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER, 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY STORM DRAINAGE PLAN

CITY OF MONROE

SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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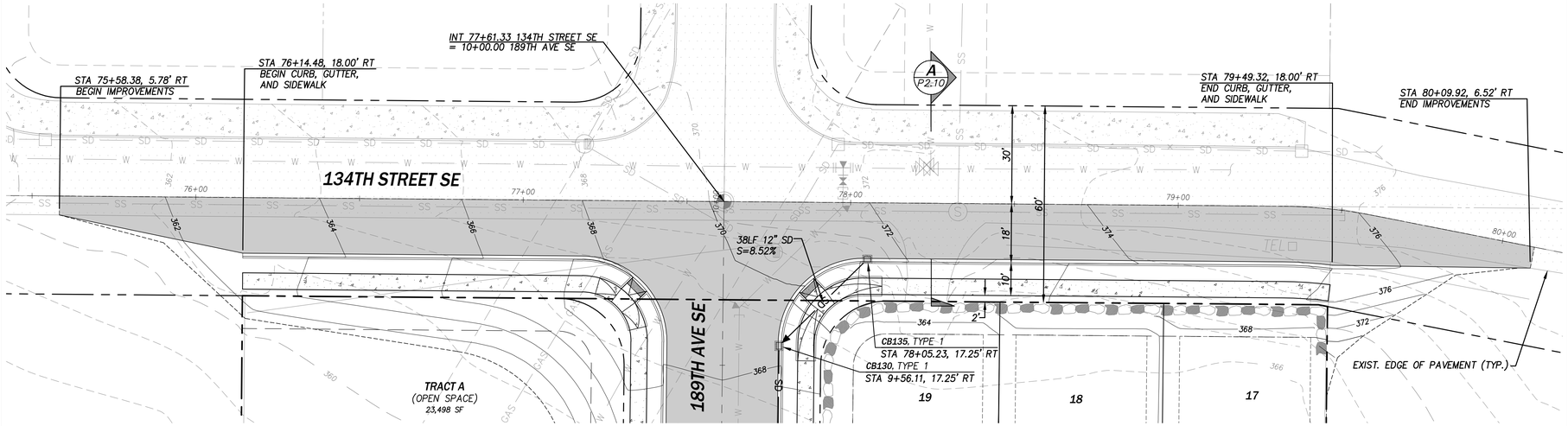
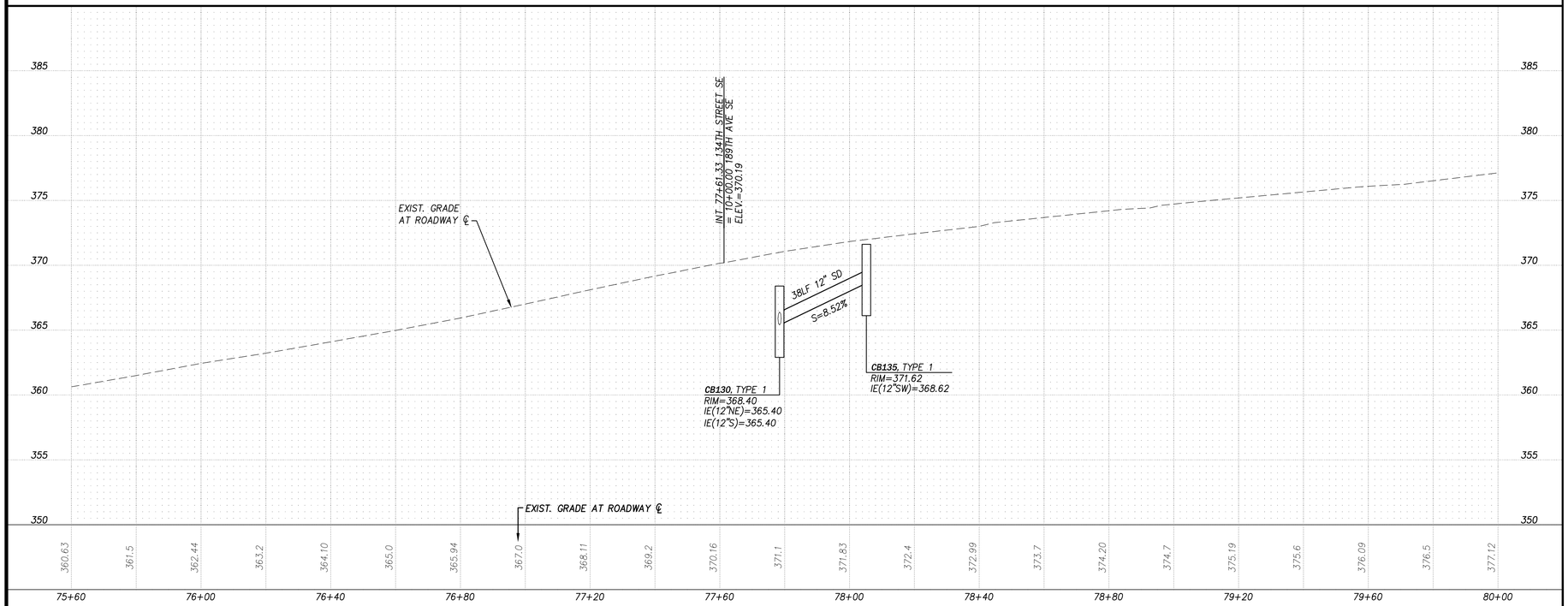
PROJECT NO. 0035-18-27

DRAWING P3.01

SHEET 7 OF 18



SEE SHEET P3.01



134TH STREET SE

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HIRSCH
STATE OF WASHINGTON
36081
REGISTERED
PROFESSIONAL ENGINEER
5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

FRONTAGE ROADWAY IMPROVEMENTS

CITY OF MONROE — SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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Site Planning • Civil Engineering
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PROJECT NO.
0035-18-27

DRAWING
P3.05

SHEET 8 OF 18

0 5 10
VERT. IN FEET

0 20 40
HORIZ. IN FEET

811
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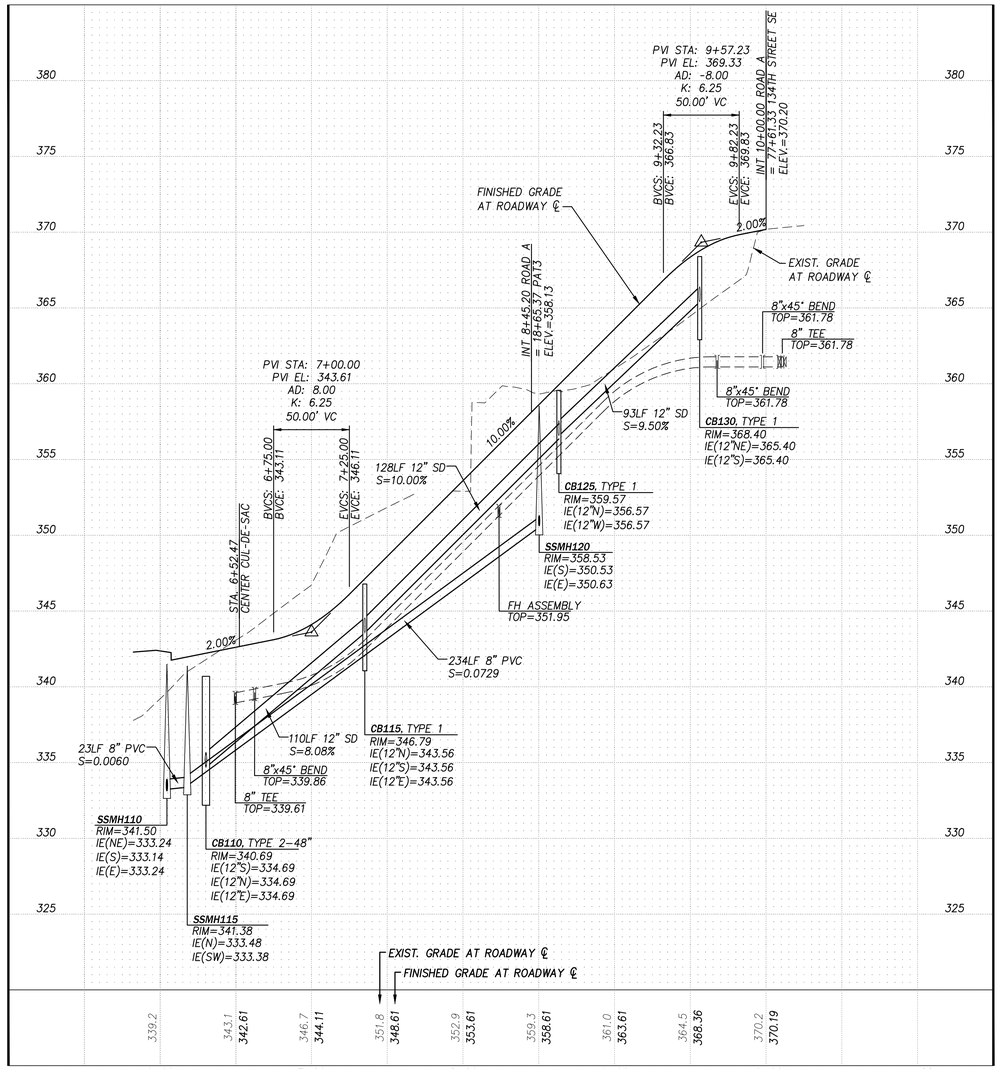

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDRICK — STATE OF WASHINGTON — 36061 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY ROAD PROFILES

CITY OF MONROE — SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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PROJECT NO. 0035-18-27

DRAWING P3.10

SHEET 9 OF 18

0 5 10 VERT. IN FEET

0 50 100 HORIZ. IN FEET

811 Know what's below. Call before you dig.

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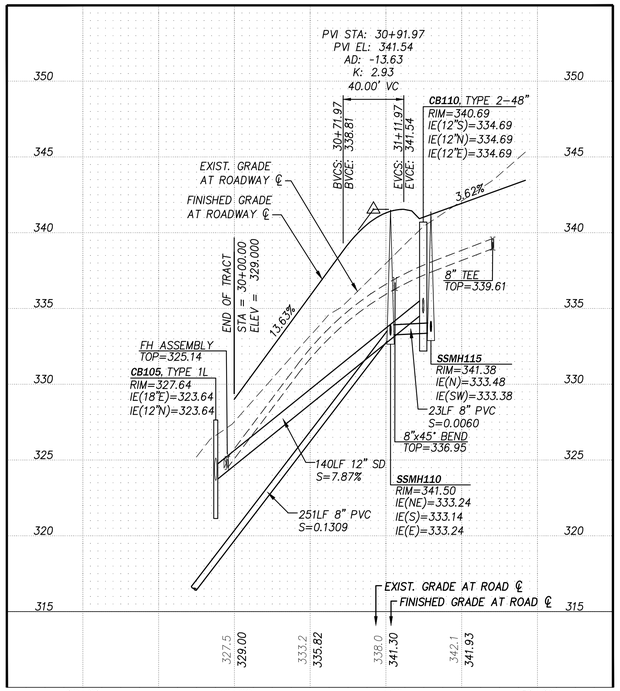
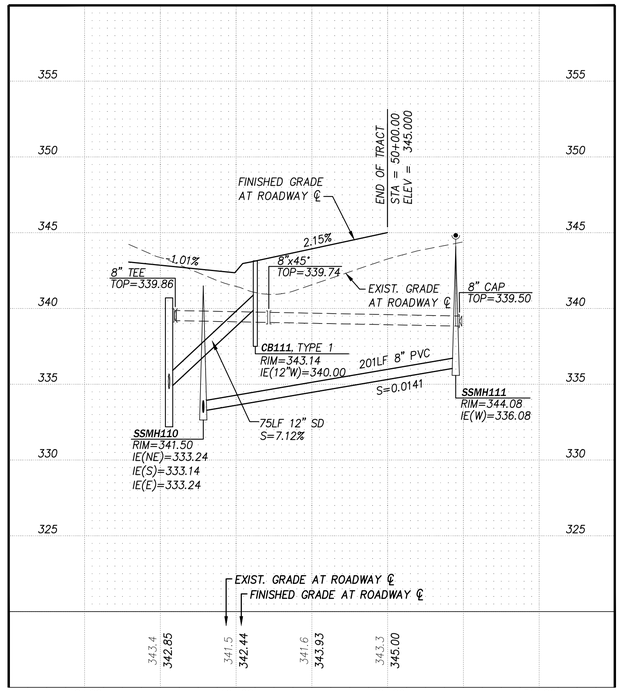
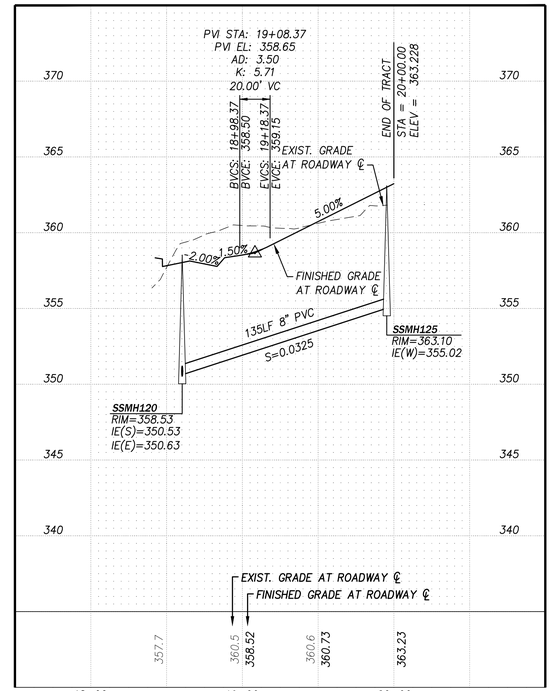


PAT1



PAT2



PAT3

NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDRICK — STATE OF WASHINGTON — 36096 — REGISTERED PROFESSIONAL ENGINEER — 5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY ROAD PROFILES

CITY OF MONROE — SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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PROJECT NO. 0035-18-27

DRAWING P3.11

SHEET 10 OF 18

0 5 10 VERT. IN FEET
0 50 100 HORIZ. IN FEET

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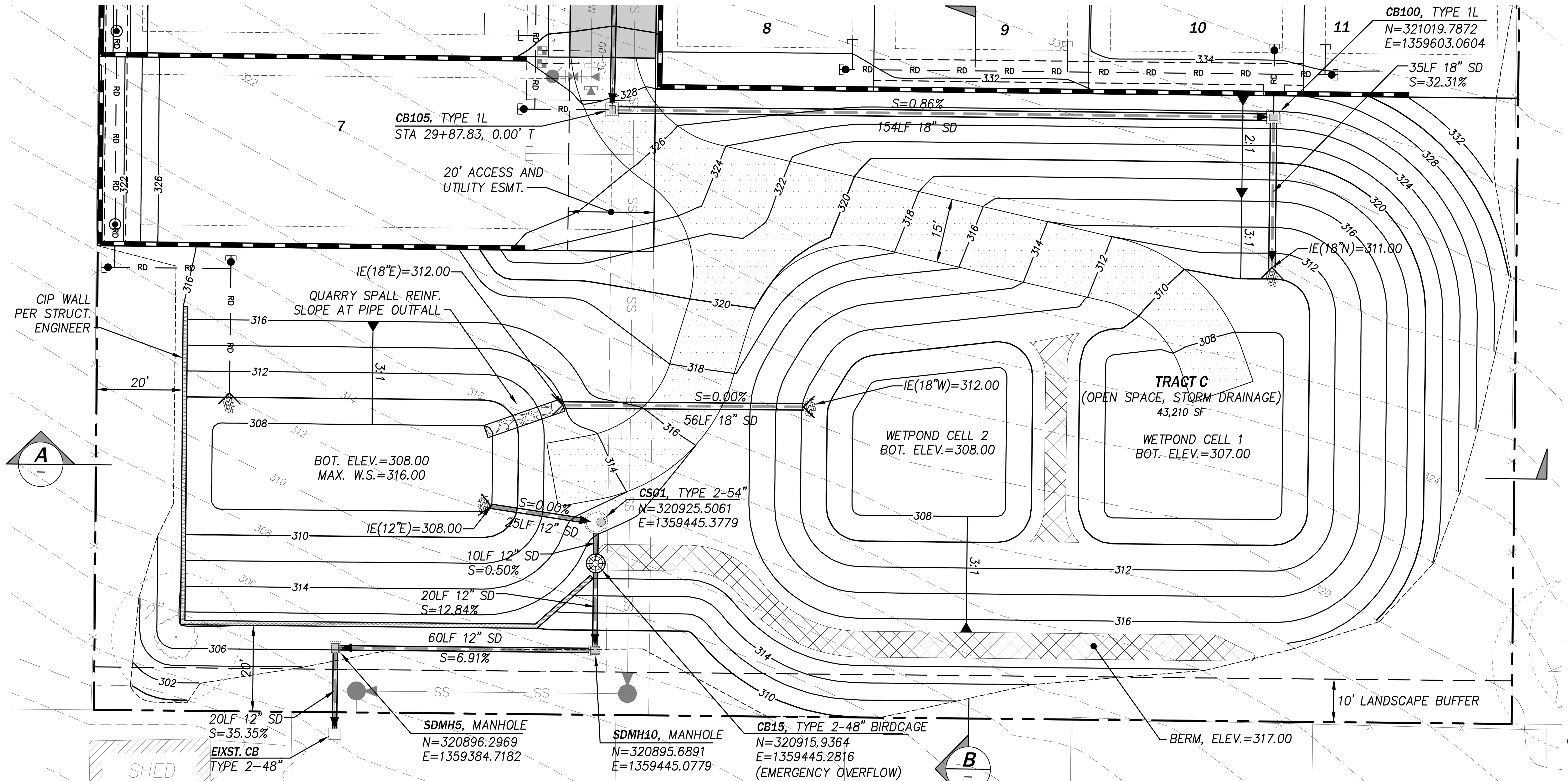
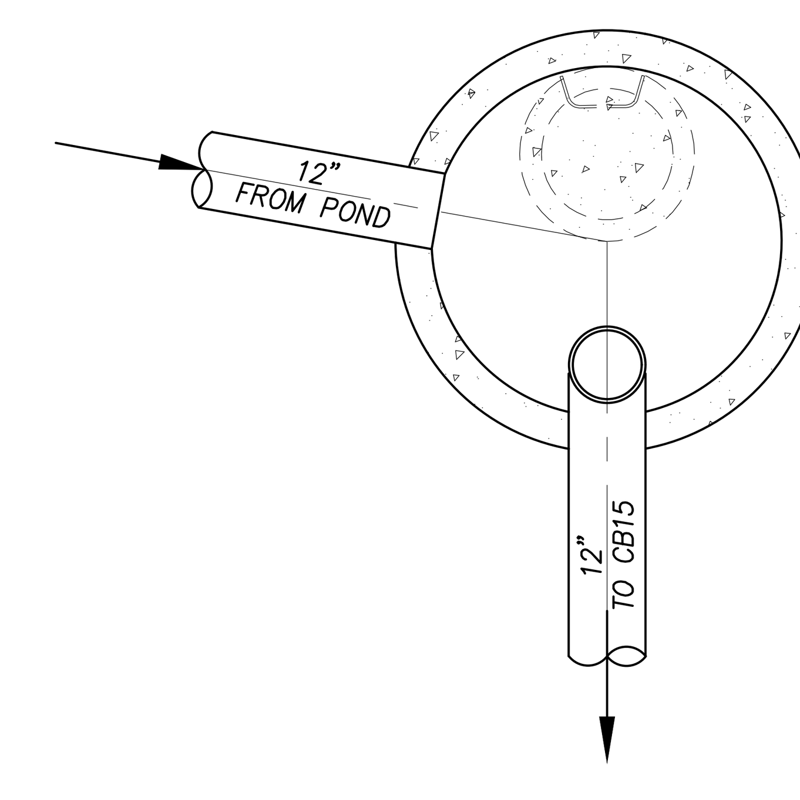
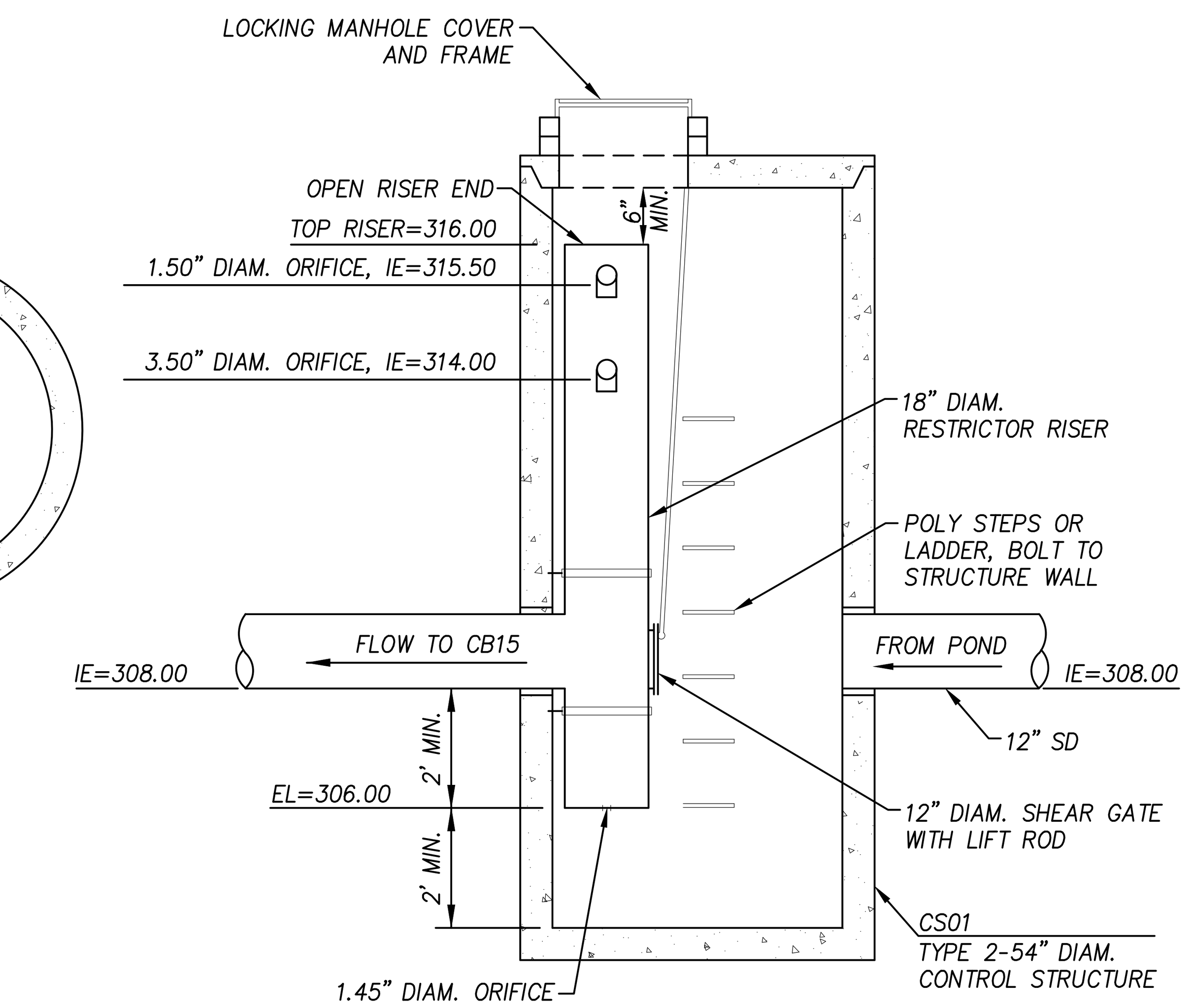


POND PLAN

SCALE: AS NOTED





FLOW CONTROL STRUCTURE – CS01

NOT TO SCALE

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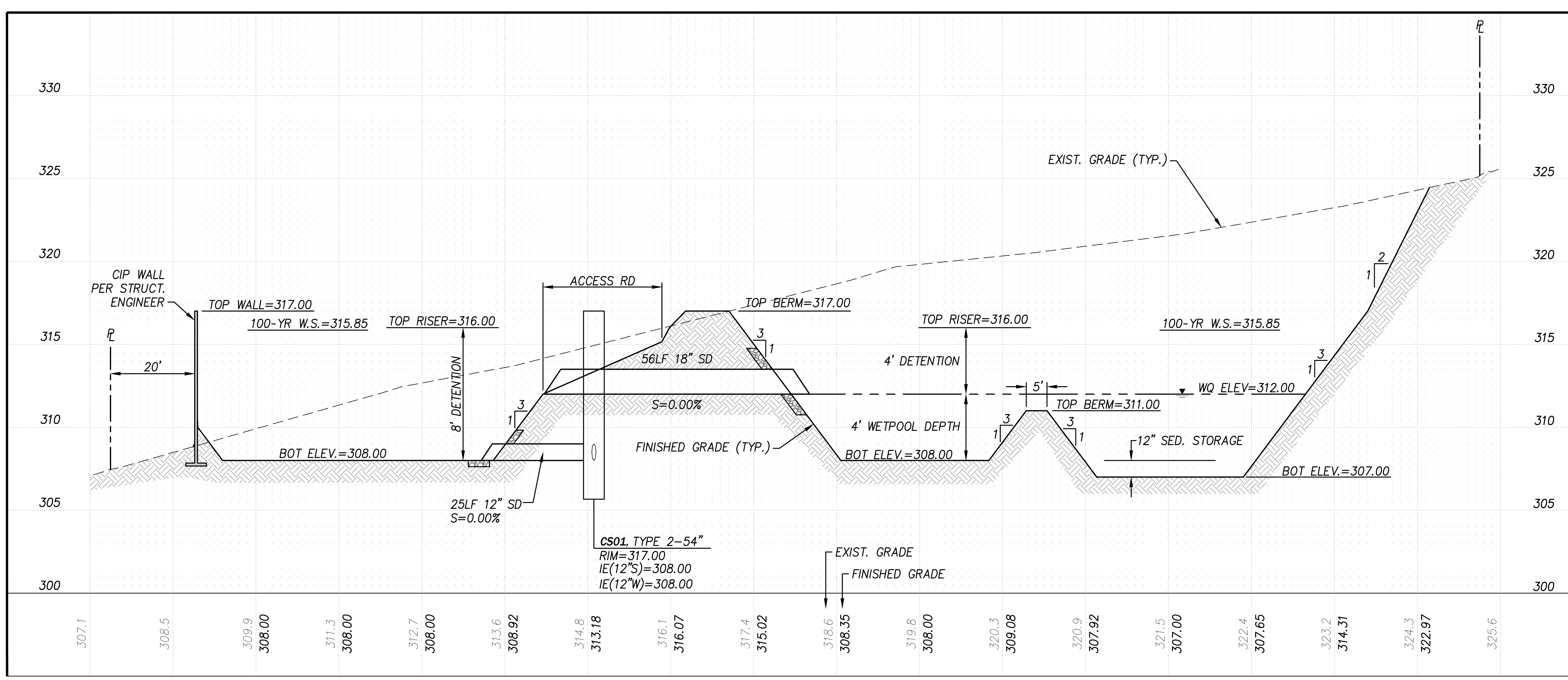
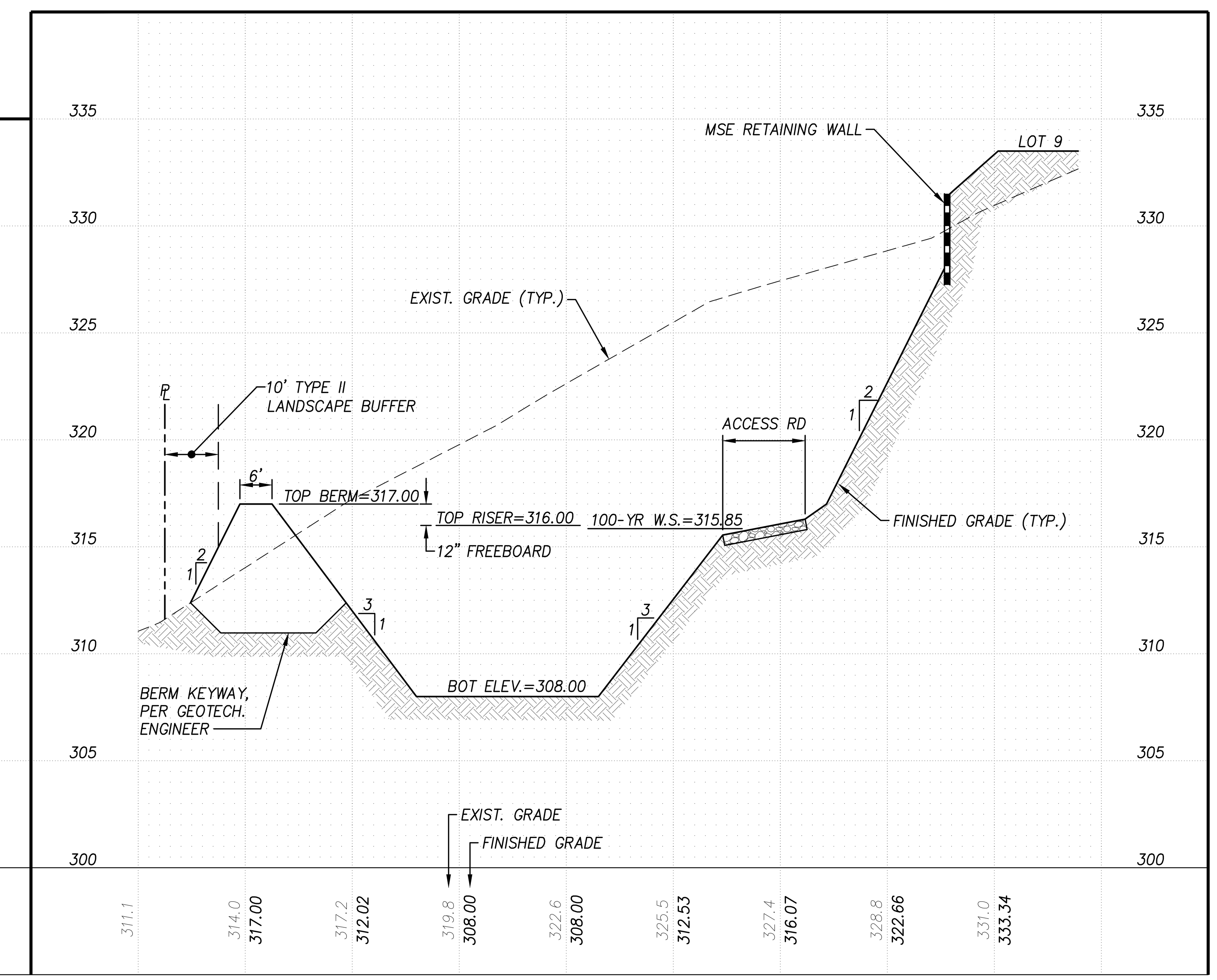


SECTION A



SECTION B

0 5 10
VERT. IN FEET
0 20 40
HORIZ. IN FEET

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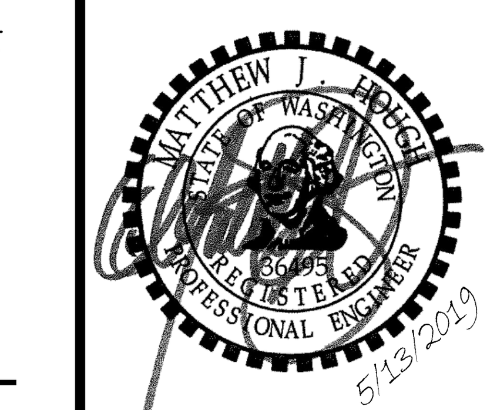

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

STORM POND PLAN AND SECTIONS

CITY OF MONROE SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

CPH CONSULTANTS
Site Planning • Civil Engineering
Land Use Consulting • Project Management
11431 Willows Rd. NE, Suite 120
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PROJECT NO. 0035-18-27

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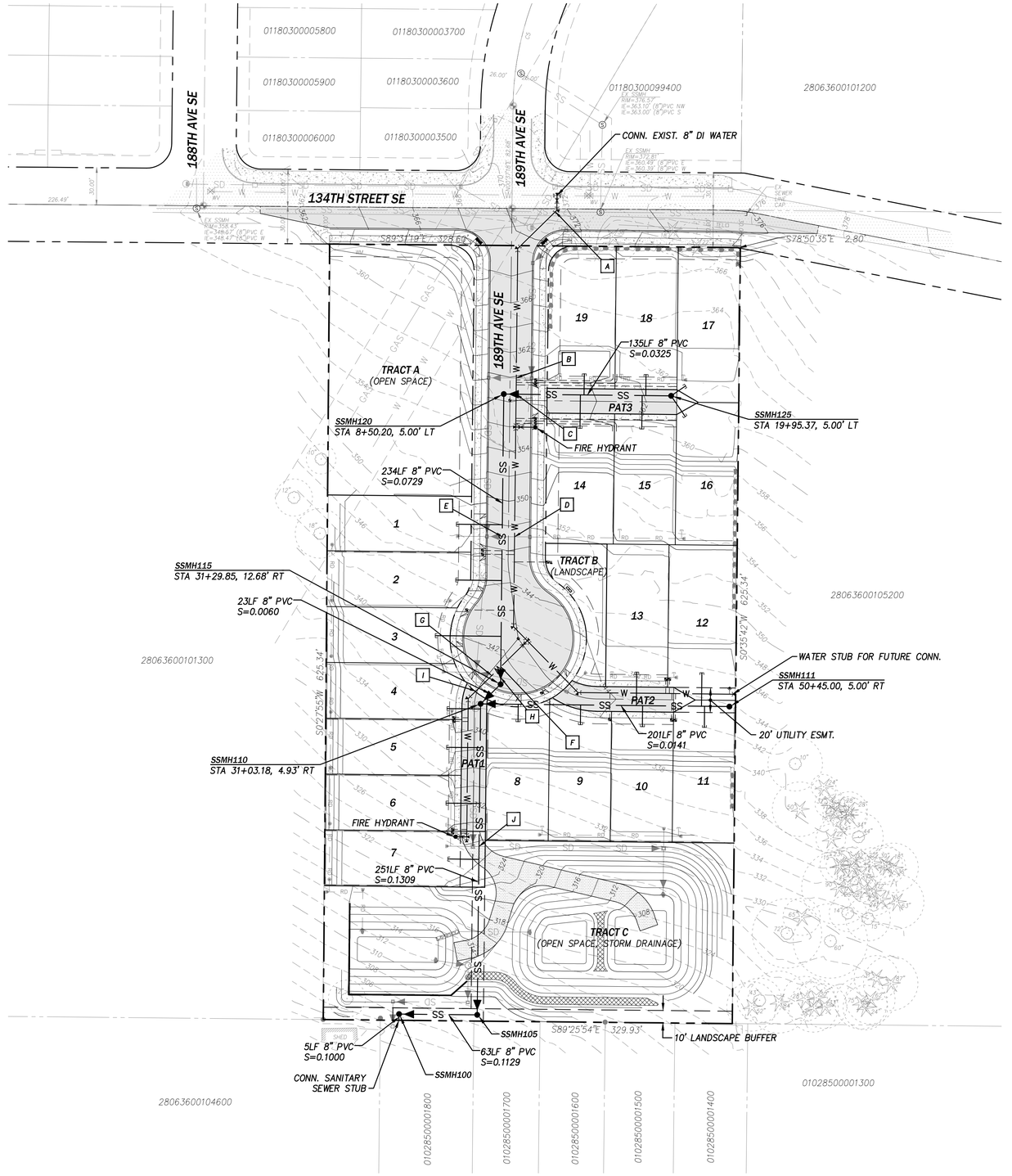
SHEET 11 OF 18

PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.



LEGEND

- STORM DRAIN
- TYPE 1 SD CATCH BASIN
- TYPE 2 SD CATCH BASIN
- SANITARY SEWER MAIN
- STANDARD PRECAST SEWER MANHOLE
- SIDE SEWER SERVICE W/CLEANOUT
- WATER MAIN
- WATER SERVICE (PIPE)
- WATER METER
- FIRE HYDRANT (FH)
- GATE VALVE
- BLOWOFF ASSEMBLY

UTILITY CROSSING DATA

A	IE 8" WA=361.11
	TOP 8" SS=359.74
B	IE 12" SD=356.50
	TOP 8" WA=355.90
C	IE 8" WA=353.93
	TOP 8" SS=351.63
D	IE 12" SD=343.70
	TOP 8" WA=343.10
E	IE 12" SD=343.63
	TOP 8" SS=342.82
F	IE 8" WA=337.81
	TOP 8" SS=335.18
G	IE 12" SD=337.43
	TOP 8" WA=336.60
H	IE 12" SD=336.12
	TOP 8" SS=334.55
I	IE 12" SD=336.64
	TOP 8" WA=334.49
J	IE 18" SD=323.60
	TOP 8" SS=318.76

0 50 100
PLAN IN FEET

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NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDRICK
STATE OF WASHINGTON
36081
REGISTERED
PROFESSIONAL ENGINEER
5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PRELIMINARY UTILITY PLAN

CITY OF MONROE SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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Site Planning • Civil Engineering
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11431 Willows Rd. NE, Suite 120
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PROJECT NO.
0035-18-27

DRAWING
P6.00

SHEET 12 OF 18

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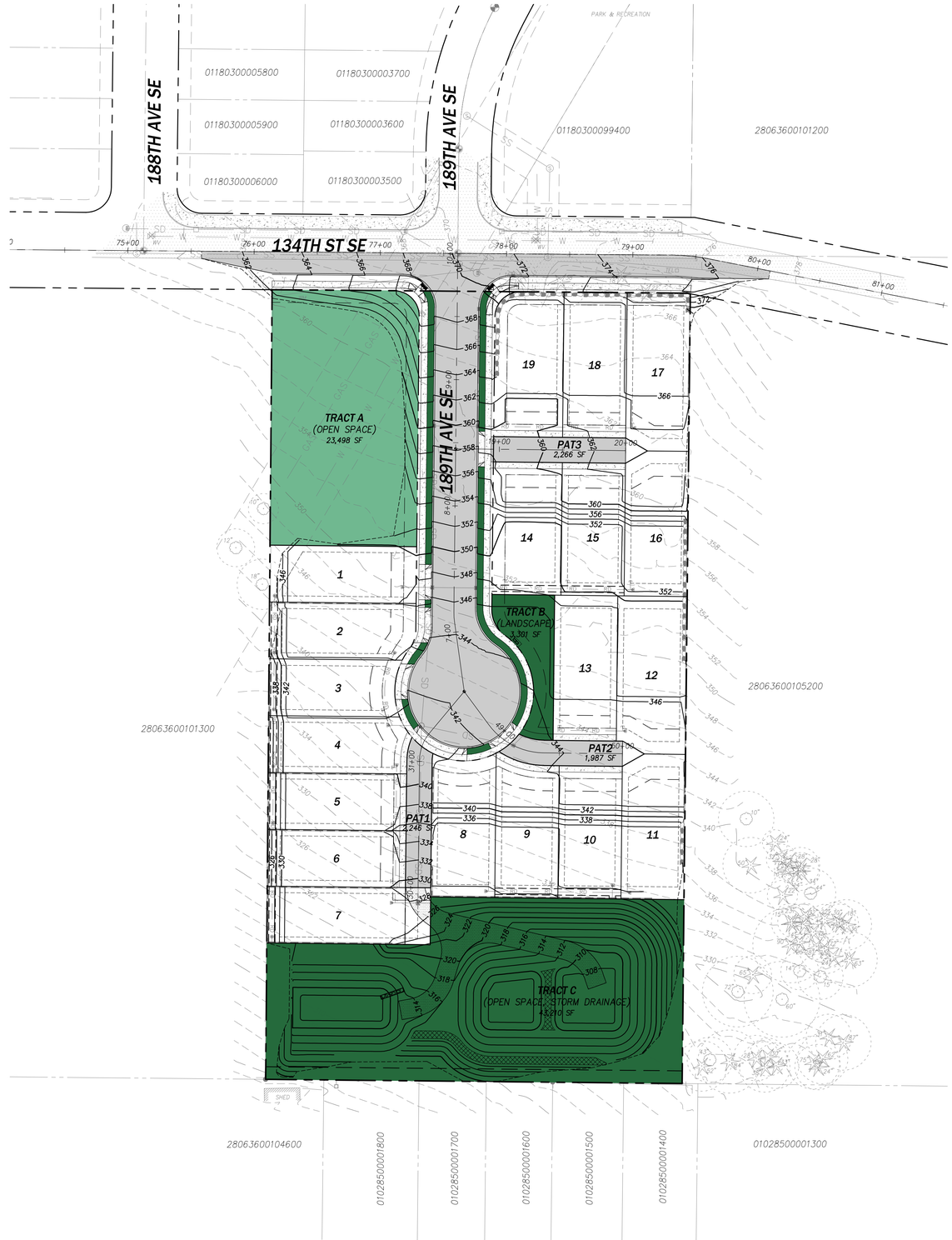
PTN. OF NE 1/4 OF SEC 36, TWP 28 N, R6E W.M.



LEGEND

- COMMON LANDSCAPE AND OPEN SPACE
- PARK AND RECREATION TRACTS

OPEN SPACE AND RECREATION

COMMON LANDSCAPE AND OPEN SPACE:	49,584 SF
PARK AND RECREATION REQUIRED:	
17 DU(BASE DENSITY) x 975 SF/DU=	16,575 SF
PARK AND RECREATION PROVIDED:	
TRACT A	23,498 SF
TOTAL	23,498 SF

NOTE: SEE LANDSCAPE PLANS FOR PARK AND RECREATION AREA PLANTING AND AMENITY DETAILS.

0 50 100
PLAN IN FEET

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NO.	DATE	REVISION	BY	CK.
1	5/13/19	PRELIMINARY PRD RESUBMITTAL	CMT	MJH

MATTHEW J. HEDRICK
STATE OF WASHINGTON
21360
REGISTERED
PROFESSIONAL ENGINEER
5/13/2019

BELMONT TERRACE PRD

PRELIMINARY SUBDIVISION AND PRD APPLICATION

PARK, RECREATION AND OPEN SPACE PLAN

CITY OF: MONROE
SNOHOMISH COUNTY, WA

CLIENT

D.R. HORTON
11241 SLATER AVENUE NE
SUITE 200
KIRKLAND, WA 98033
PHONE: (425) 825-3186

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PROJECT NO.
0035-18-27

DRAWING
P7.00

SHEET 13 OF 18

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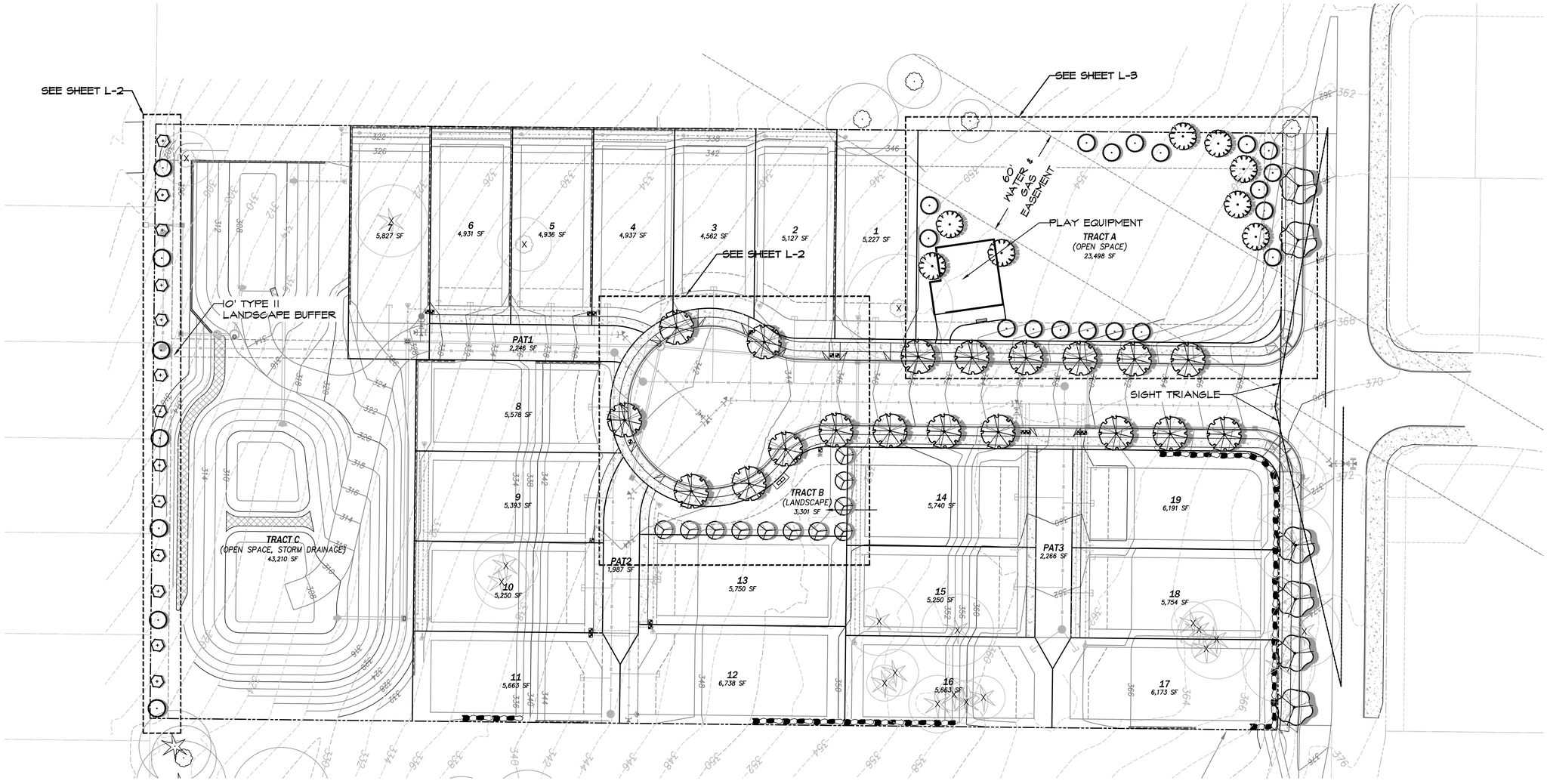
5/13/2019 4:07 PM CASEY TORRES

PTN. OF NE ¼ OF SEC 36, TWP 28 N, R6E W.M.



PLANT SCHEDULE ENTIRE SITE

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Acer circinatum / Vine Maple	1.5"Cal	13
	Acer rubrum 'Bowhall' / Bowhall Maple	1.5" Cal.	11
	Cercidiphyllum japonicum / Katsura Tree	1.5"Cal	8
EVERGREEN TREES	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**QTY**
	Thuja plicata 'Excelsa' / Excelsa Cedar	6'-8' Ht	25
STREET TREE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**QTY**
	Pyrus calleryana 'Capital' / Capital Callery Pear	2"Cal	19
	Zelkova serrata 'Musashino' / Musashino Zelkova	2"Cal	6

LANDSCAPE PLAN
SCALE: 1" = 30' - 0"

GRAPHIC SCALE
-30 0 15 30 60
(IN FEET)
1 inch = 30 feet

IRRIGATION PLAN NOTE:

PARK AND OTHER MAINTAINED LANDSCAPE AREAS WITHIN THE PROJECT, INCLUDING PLANTER STRIP AREAS, SHALL BE IRRIGATED IN ACCORDANCE WITH APPLICABLE CITY OF MONROE MUNICIPAL CODE (MMC) AND PUBLIC WORKS STANDARDS. COMPLETE IRRIGATION PLANS AND SYSTEM DETAILS CONFORMING WITH THE PROVISIONS OF MMC 18.78.060 WILL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL WITH THE FINAL ENGINEERING PERMIT SUBMITTAL.

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BOTHELL, WA 98021
425-241-6256

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LANDSCAPE ARCHITECT
Loyle Cramer
LOYLE L. CRAMER
CERTIFICATE NO. 634

BELMONT TERRACE
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-1
OF 5 SHEETS

PTN. OF NE ¼ OF SEC 36, TWP 28 N, R6E W.M.

IRRIGATION PLAN NOTE:

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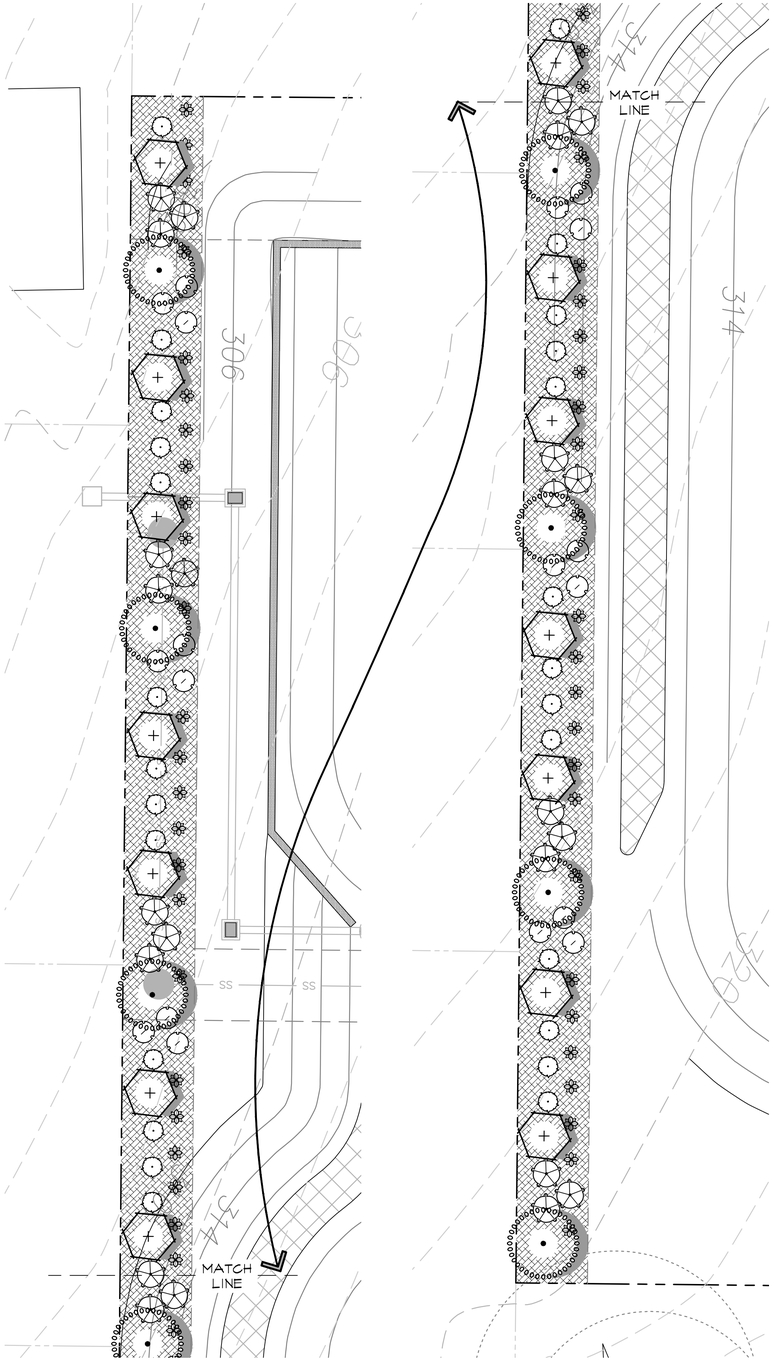

LANDSCAPE BUFFER PLAN
SCALE: 1" = 10' - 0"

GRAPHIC SCALE
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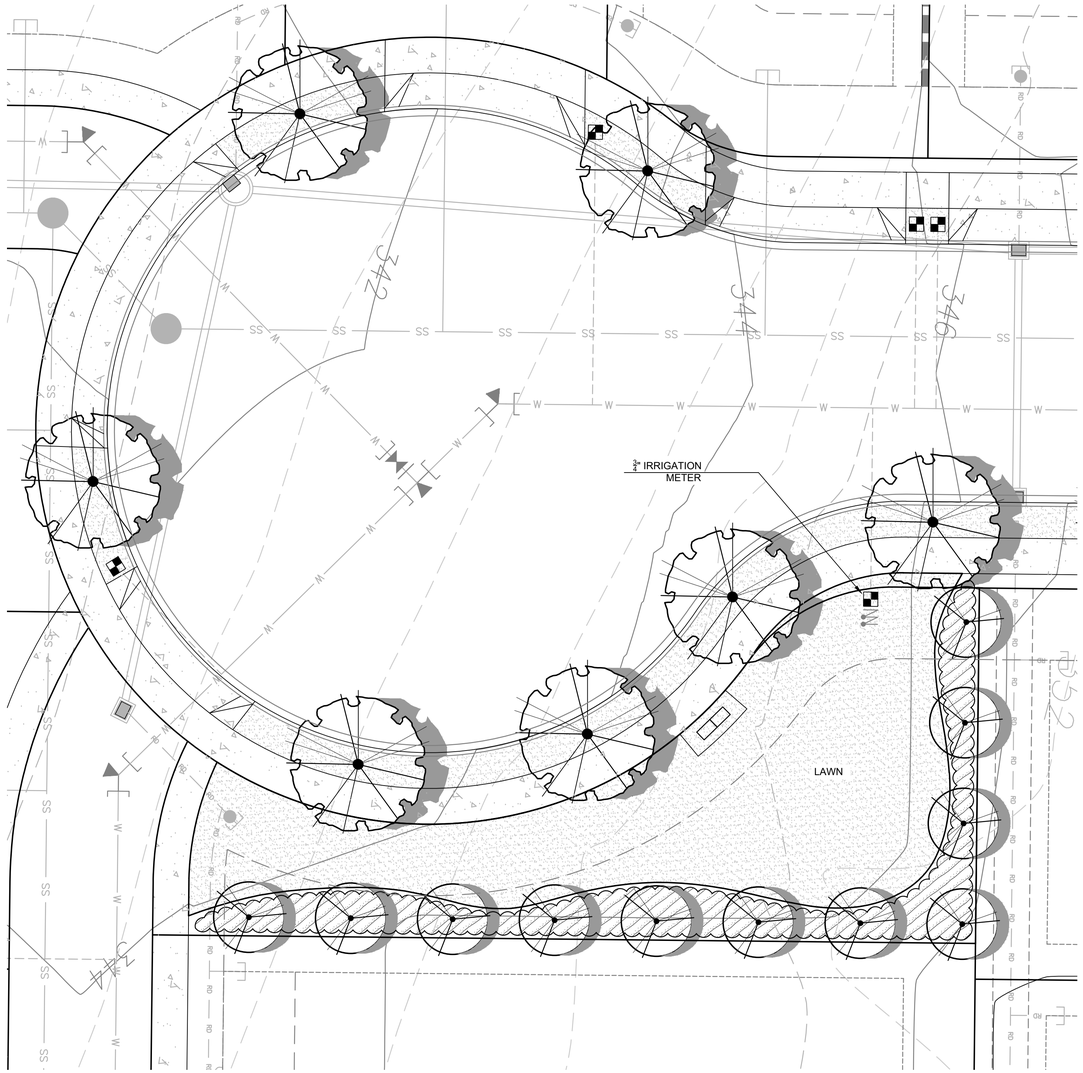
(IN FEET)
1 inch = 10 feet



TRACT B LANDSCAPE PLAN
SCALE: 1" = 10' - 0"

GRAPHIC SCALE
-10 0 5 10 20
(IN FEET)
1 inch = 10 feet

Drawn: ELK
ELK

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LANDSCAPE ARCHITECT
1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
KYLE L. CRAMER
CERTIFICATE NO. 634

BELMONT TERRACE
18830 134TH STREET SE
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SHEET
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PTN. OF NE $\frac{1}{4}$ OF SEC 36, TWP 28 N, R6E W.M.

IRRIGATION PLAN NOTE:

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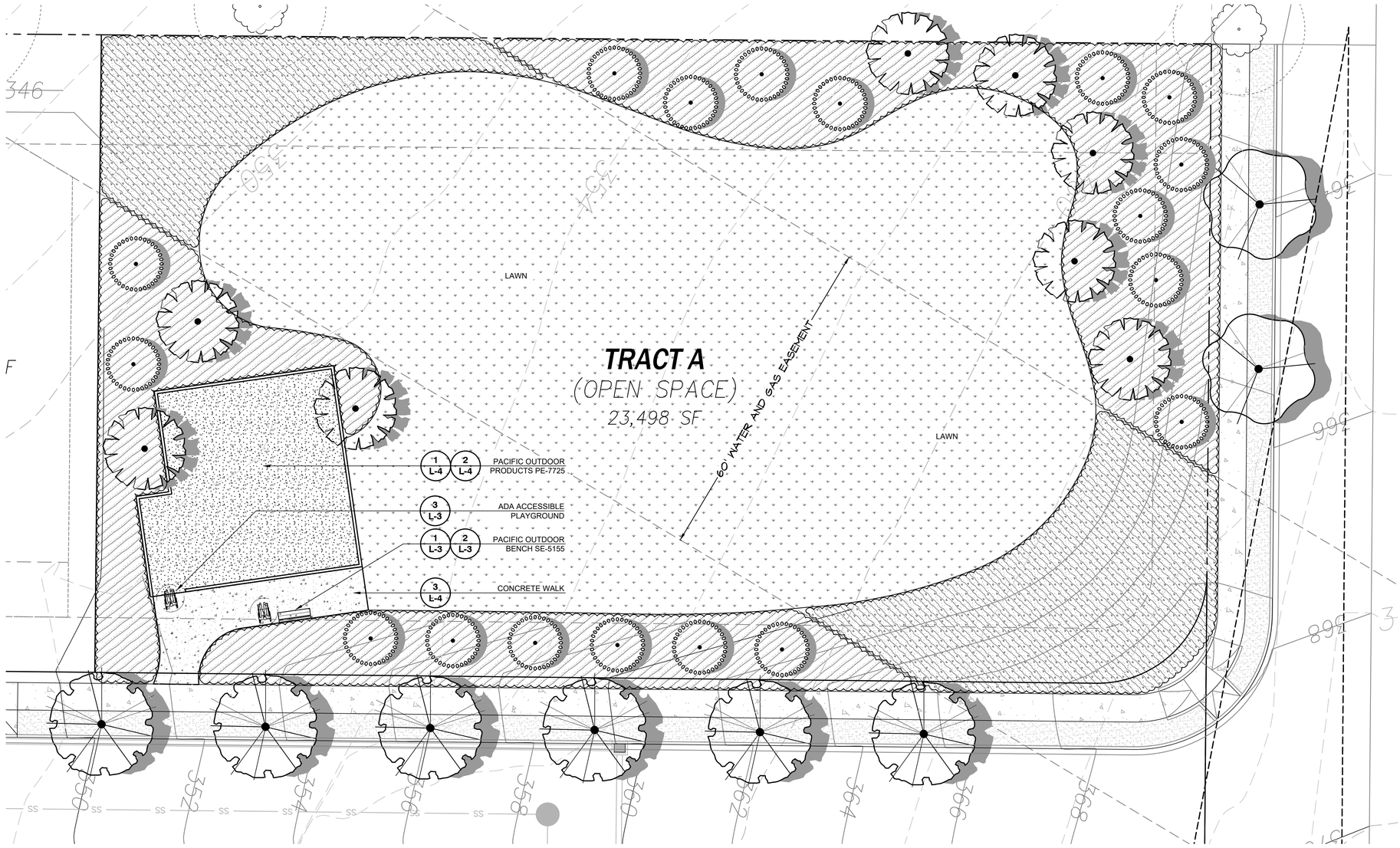
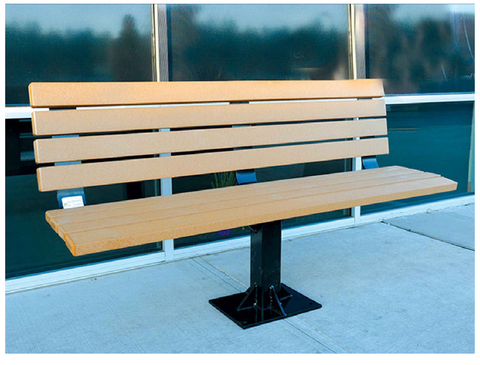


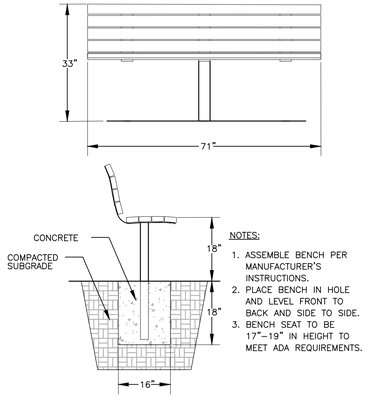
TRACT A LANDSCAPE PLAN
SCALE: 1" = 10' - 0"

GRAPHIC SCALE
-10 0 5 10 20
(IN FEET)
1 inch = 10 feet

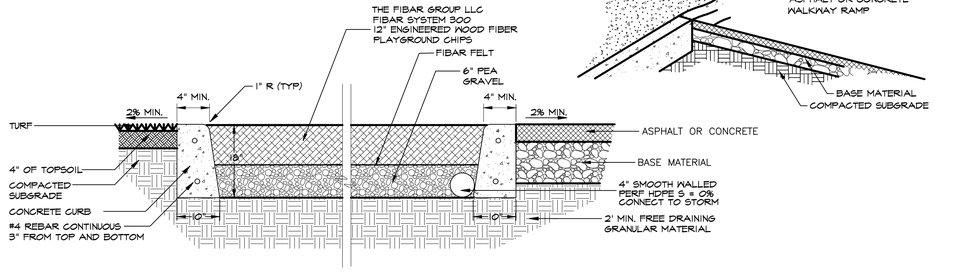
NOTE: BENCH TO BE MADE OF RECYCLED HDPE PLASTIC, POWDER COATED GREEN FRAME, & IN-GROUND MOUNTED



1 PACIFIC OUTDOOR BENCH SE-5155



2 IN-GROUND BENCH INSTALLATION
NTS



3 ADA ACCESSIBLE PLAYGROUND
NTS

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ELK
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LANDSCAPE ARCHITECT
LOYD L. CRAMER
CERTIFICATE NO. 634

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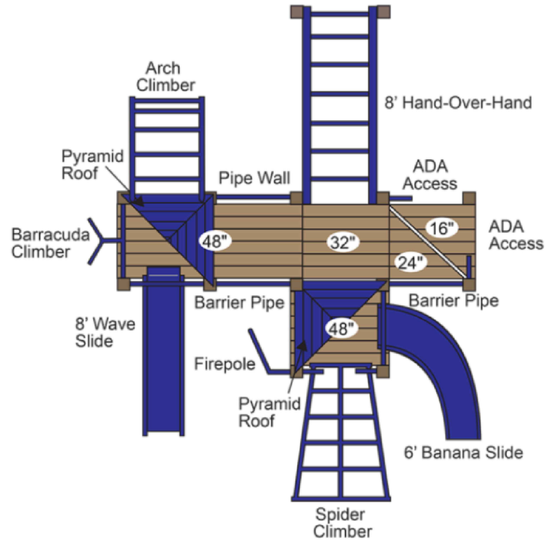
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-3
OF 5 SHEETS

NOTE: PLAYGROUND EQUIPMENT TO BE MADE OF RECYCLED HDPE PLASTIC

AREA NEEDED: 32' X 36'
AGES 5–12
CAPACITY 34–42
ACTIVITIES 7

1 PACIFIC OUTDOOR PRODUCTS PE-7725



2 PACIFIC OUTDOOR PRODUCTS PE-7725 PLAN VIEW

IRRIGATION PLAN NOTE:

PARK AND OTHER MAINTAINED LANDSCAPE AREAS WITHIN THE PROJECT, INCLUDING PLANTER STRIP AREAS, SHALL BE IRRIGATED IN ACCORDANCE WITH APPLICABLE CITY OF MONROE MUNICIPAL CODE (MMC) AND PUBLIC WORKS STANDARDS. COMPLETE IRRIGATION PLANS AND SYSTEM DETAILS CONFORMING WITH THE PROVISIONS OF MMC 18.78.060 WILL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL WITH THE FINAL ENGINEERING PERMIT SUBMITTAL.

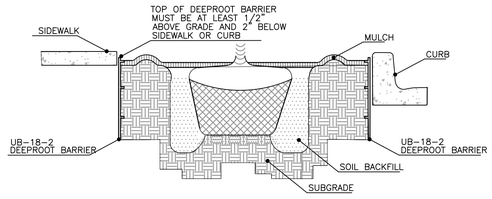
3 CONCRETE WALK
NTS

INSTALLATION SEQUENCE:

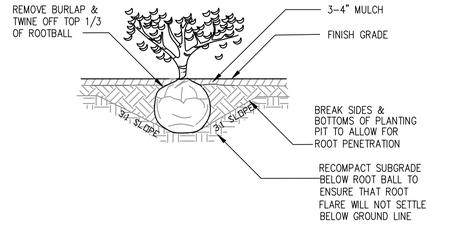
1. Prepare base and subgrade
2. Trench to appropriate depth for installation of root barrier so that top of barrier is 2" (5cm) below finish grade at top of curb.
3. Place root barrier in trench, vertical ribs must face toward tree roots.
4. Backfill and compact to requirements.

For additional information please visit our website at www.deeproot.com

For information regarding distributors please call: 1 800 ILV ROOT (458.7668). For help with drainage or other difficult installation questions please call DeepRoot Technical Support at: 1 800 ROOT TEK (768.8835).

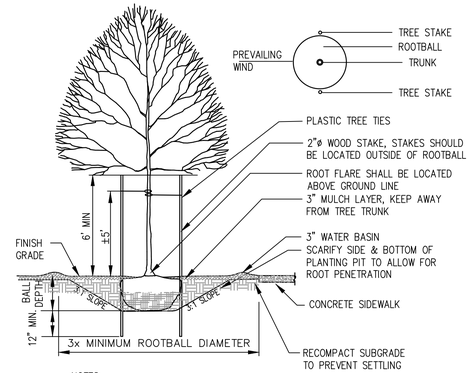


4 18" TREE ROOT BARRIER FOR PLANTING STRIP
NTS



5 TYPICAL SHRUB PLANTING DETAIL
NTS

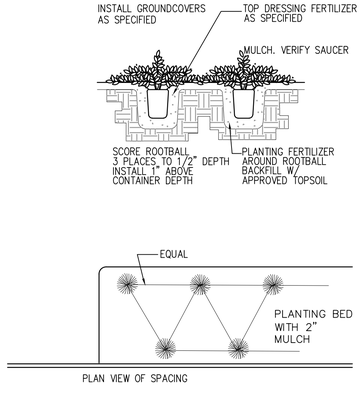
6 TYPICAL EVERGREEN TREE PLANTING DETAIL
NTS



NOTES:

1. TREE PIT SHALL NOT BE LESS THAN (3) TIMES ROOT BALL DIA.
2. CUT ALL TIES AND FOLD BACK BURLAP FROM UPPER 1/3 OF ROOT BALL
3. REMOVE ALL PLASTIC AND TWINE
4. TREE STAKES PERPENDICULAR TO THE PREVAILING WIND
5. PLANT TREES 2" HIGHER THAN DEPTH GROWN IN NURSERY

7 TYPICAL DECIDUOUS TREE PLANTING DETAIL
NTS



8 TYPICAL GROUNDCOVER PLANTING DETAIL
NTS

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ELK

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1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

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REGISTERED
LANDSCAPE ARCHITECT
LOYLE L. CRAMER
CERTIFICATE NO. 634

BELMONT TERRACE
18830 134TH STREET SE
MONROE WASHINGTON

SHEET
L-4
OF 5 SHEETS

PLANT SCHEDULE 10' BUFFER

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Acer circinatum / Vine Maple	1.5"Cal		13
EVERGREEN TREES	**BOTANICAL NAME / COMMON NAME**	**SIZE**		**QTY**
	Thuja plicata 'Excelsa' / Excelsa Cedar	6'-8' Ht		7
SHRUBS	**BOTANICAL NAME / COMMON NAME**	**SIZE**		**QTY**
	Cornus sericea 'Elegantissima' / Variegated Redtwig Dogwood	18" Ht. min.		21
	Mahonia aquifolium 'Compacta' / Compact Oregon Grape	18" Ht. min.		25
	Polystichum munitum / Western Sword Fern	12" Ht. min.		46
	Symphoricarpos x 'Bokrabright' / Bright Fantasy Snowberry	18" Ht. min.		18
GROUND COVERS	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Arctostaphylos uva-ursi / Kinnikinnick	1 gal	36" o.c.	270

PLANT SCHEDULE STREET TREE & PLANTING STRIP

STREET TREE	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Pyrus calleryana 'Capital' / Capital Callery Pear	2"Cal		19
	Zelkova serrata 'Musashino' / Musashino Zelkova	2"Cal		6
LAWN	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Lawn	sod		3,986 sf

IRRIGATION PLAN NOTE:

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PLANT SCHEDULE TRACT A

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Cercidiphyllum japonicum / Katsura Tree	1.5"Cal		8
EVERGREEN TREES	**BOTANICAL NAME / COMMON NAME**	**SIZE**		**QTY**
	Thuja plicata 'Excelsa' / Excelsa Cedar	6'-8' Ht		18
LANDSCAPE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Groundcover Only	---		3,306 sf
	Shrubs and Groundcovers	---		6,166 sf
SEED	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Sun & Shade Lawn Blend JB Sod 70% Perennial Ryegrass 30% Fine Fescue Apply April - Oct with Irrigation 7 lbs per 1,000 sq ft	Hydroseed		12,650 sf
SITE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	12" Engineered Play Chips	N/A		1,260 sf

PLANT SCHEDULE TRACT B

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	SIZE		QTY
	Acer rubrum 'Bowhall' / Bowhall Maple	1.5" Cal.		11
LANDSCAPE	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Shrubs and Groundcovers	---		700 sf
LAWN	**BOTANICAL NAME / COMMON NAME**	**SIZE**	**SPACING**	**QTY**
	Lawn	sod		2,320 sf

LANDSCAPE NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL OTHER SITE IMPROVEMENTS AND CONDITIONS PRIOR TO STARTING LANDSCAPE WORK.

2. CONTRACTOR SHALL USE CAUTION WHILE EXCAVATING TO AVOID DISTURBING ANY UTILITIES ENCOUNTERED. CONTRACTOR IS TO PROMPTLY ADVISE OWNER OF ANY DISTURBED UTILITIES. LOCATION SERVICE PHONE 1-800-424-5555.

3. CONTRACTOR SHALL MAINTAIN AND WATER ALL PLANT MATERIAL FOR 1 YEAR OR UNTIL FINAL INSPECTION AND ACCEPTANCE BY OWNER.

4. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING QUANTITIES OF PLANTS THAT ARE REPRESENTED BY SYMBOLS ON THE DRAWING.

5. SUBGRADE IS TO BE WITHIN ½ INCH OF 1 FOOT AS PROVIDED BY OTHERS. ALL PLANTING AREAS TO BE CLEARED OF ALL CONSTRUCTION MATERIAL AND ROCKS & STICKS LARGER THAN 2 INCH DIAMETER.

6. 4 INCH DEPTH TOPSOIL IN LANDSCAPE AREA.

7. 2 INCH DEPTH, 3 FOOT DIAMETER BARK RING AROUND BASE OF STREET TREES AND OTHER TREES LOCATED IN LAWN.

8. TREES SHOULD BE PLANTED SO THAT THE CENTER OF EACH TRUNK IS 3 FEET FROM THE BACK OF CURB OR IF PLANTED BEHIND A SIDEWALK 3 FEET FROM THE BACK OF A SIDEWALK WHERE TREES ARE TO BE PLANTED ADJACENT TO A SIDEWALK.

9. GROUND COVERS SHALL BE PLANTED IN AN EQUILATERAL TRIANGULAR SPACING PATTERN AT THE ON-CENTER DISTANCES SHOWN ON THE PLAN OR IN THE PLANT SCHEDULE. WHERE GROUND COVER ABUTS CURBING, SIDEWALKS, SIGNS OR POLES, MINIMUM PLANTING DISTANCES SHALL BE 12" FROM CENTER OF PLANT TO CURB, SIDEWALK, ETC. MINIMUM PLANTING DISTANCE SHALL BE 24" FROM CENTER OF TREES AND SHRUBS.

10. ALL PLANT MATERIAL SHALL BE FERTILIZED WITH AGRO TRANSPLANT FERTILIZER 4-2-2 PER MANUFACTURERS SPECIFICATIONS.

11. ALL PLANT MATERIAL SHALL CONFORM TO AAN STANDARDS FOR NURSERY STOCK LATEST EDITION. ALL PLANT MATERIAL FURNISHED SHALL BE HEALTHY REPRESENTATIVES, TYPICAL OF THEIR SPECIES OF VARIETY AND SHALL HAVE A NORMAL GROWTH HABIT. THEY SHALL BE FULL, WELL BRANCHED, WELL PROPORTIONED, AND HAVE A VIGOROUS, WELL DEVELOPED ROOT SYSTEM. ALL PLANTS SHALL BE HARDY UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT. TREES, SHRUBS AND GROUNDCOVER QUANTITIES, SPECIES, VARIETIES, SIZES AND CONDITIONS TO BE AS SHOWN ON THE PLANTING PLAN. PLANTS TO BE FREE OF DISEASE, INJURY, INSECTS, DECAY, HARMFUL DEFECTS AND ALL WEEDS. NO SUBSTITUTIONS SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM LANDSCAPE ARCHITECT OR OWNER.

12. IRRIGATION PLANS FOR PARK AND MAINTAINED LANDSCAPE AREAS, INCLUDING PLANTER STRIP AREAS, WILL BE PROVIDED WITH FINAL ENGINEERING REVIEW PLAN SET FOR CITY REVIEW AND APPROVAL (SEE LANDSCAPE PLAN NOTE).

13. TREES TO BE PLANTED MINIMUM 5 FEET FROM PROJECT BOUNDARIES.

14. THE AVERAGE SPACING FOR STREET TREES SHOULD BE 30 FEET ON CENTER AND ADJUSTED TO ALLOW FOR SIGHT LINES, UTILITIES, TRAFFIC SIGNS, LIGHT STANDARDS, DRIVEWAYS AND OTHER STREET APPURTENANCES.

15. DO NOT PLANT STREET TREES WITHIN TWENTY FEET OF STREET LIGHTS.

16. LANDSCAPING SHALL BE PLANTED AND MAINTAINED IN A MANNER SO AS TO PROVIDE 36" CLEARANCE AROUND THE CIRCUMFERENCE OF FIRE HYDRANTS.

17. PROVIDE UB-18-2 DEEP ROOT BARRIER ADJACENT TO SIDEWALK AND CURB WITHIN PLANTER STRIPS. PROVIDE ROOT BARRIER BETWEEN TREE AND DRIVEWAY APRONS, WATER METERS AND FIRE HYDRANTS WHERE DISTANCE IS LESS THAN 8'. ROOT BARRIER IS TO BE 16' IN LENGTH WITH TREE CENTERED ON THIS LENGTH.

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ELK
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1909 242ND STREET SE
BOTHELL, WA 98021
425-241-6256

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MONROE WASHINGTON

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ATTACHMENT #12

CP|H
CONSULTANTS

Storm Drainage Report

Belmont Terrace PRD
CPH Project No. 0035-18-027

Monroe, WA

RECEIVED
05/14/2019
CITY OF MONROE

Prepared for:

SSHI, LLC dba D.R. Horton
12910 Totem Lake Blvd NE,
Suite 220
Kirkland, WA 98034

Prepared by:

CPH Consultants
Matt Hough, PE
Casey Torres, EIT
11431 Willows RD NE, Suite 120
Redmond, WA 98052

May 13, 2019

CP|H
CONSULTANTS

STORM DRAINAGE REPORT

FOR

BELMONT TERRACE PRD

MONROE, WA

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SECTION 2 – EXISTING CONDITIONS SUMMARY.....3

SECTION 3 – OFF-SITE ANALYSIS.....4

OFFSITE ANALYSIS

UPSTREAM ANALYSIS

DOWNSTREAM ANALYSIS

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PERFORMANCE STANDARDS AND GOALS

PRE-DEVELOPED SITE HYDROLOGY

ON-SITE STORMWATER MANAGEMENT

DEVELOPED SITE HYDROLOGY

CONVEYANCE SYSTEM ANALYSIS AND DESIGN

WATER QUALITY TREATMENT

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APPENDICES

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GEOTECHNICAL REPORT
(TERRA ASSOCIATES, INC. DECEMBER 4, 2018)

APPENDIX B – WWHM INPUT PARAMETERS AND RESULTS

APPENDIX C – CONVEYANCE CALCULATIONS

APPENDIX D – DOWNSTREAM ANALYSIS

APPENDIX E – OPERATIONS AND MAINTENANCE MANUAL

SECTION 1 – PROJECT OVERVIEW

This Storm Drainage Report (SDR) describes the engineering analysis of the surface water conditions, proposed development improvements, and required storm drainage facilities for the *Belmont Terrace PRD* project located in Monroe, Washington. The report summarizes the design criteria for the storm drainage collection systems, associated flow control (i.e. detention) and water quality facilities, and temporary construction Best Management Practices (BMPs) proposed for the project. Figure 1 (Vicinity Map) illustrates the general location of the project site. Figures 2 and 3 of this report (see *Figures* section) illustrate the existing (i.e., pre-developed) and proposed developed conditions of the project area, respectively.

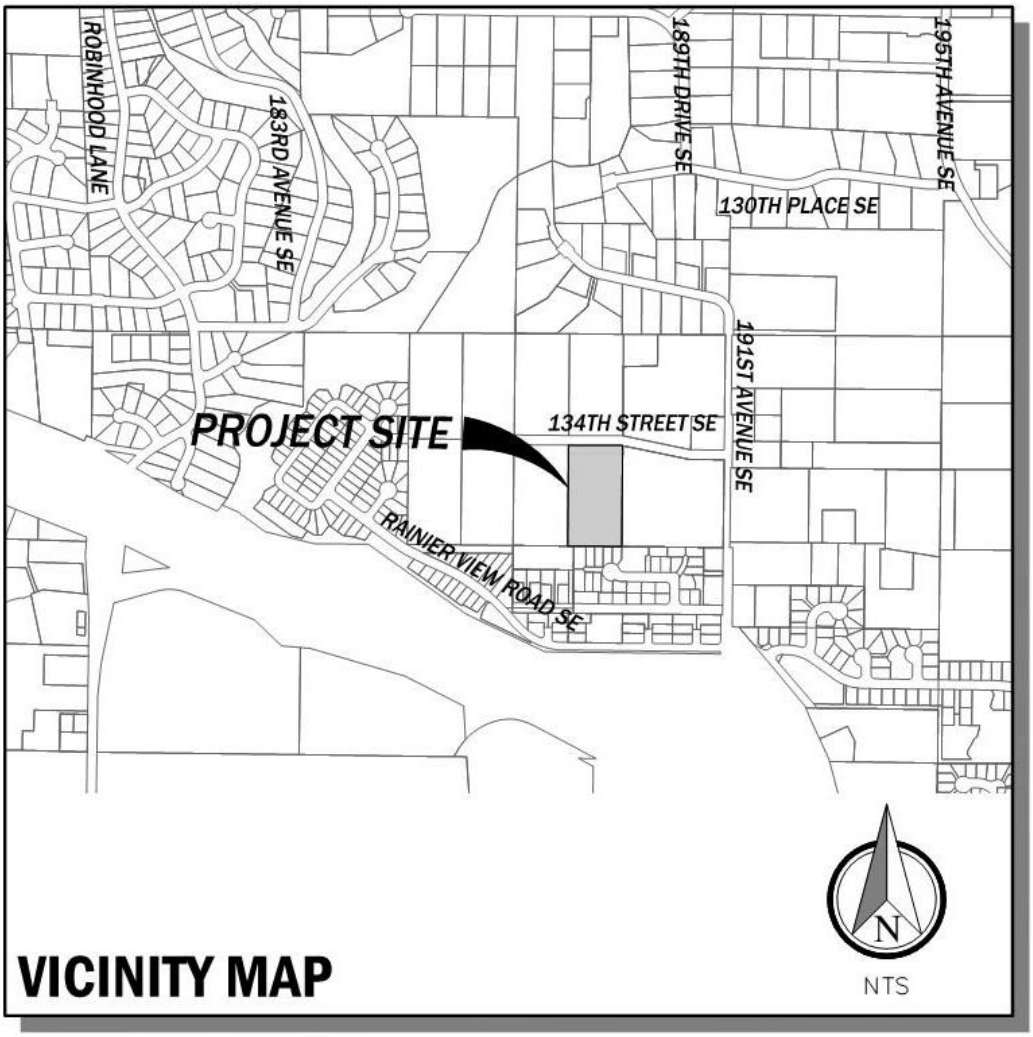


Figure 1 - Vicinity Map

The *Belmont Terrace PRD* project proposes to develop 19 new single-family residential lots, per the requirements of UR9600 zoning, through the City of Monroe's planned residential development process (PRD). The development will include associated roadway, storm drainage, sewer, and water infrastructure improvements to serve these proposed lots. It will provide park and recreational open space onsite per PRD guidelines and will improve its 134th Street SE frontage with new pavement, curb and gutter, planter, and sidewalk. The project site is 4.75-acres and consists of one developed property containing a single-family residence and associated structures within the Monroe city limits. Existing access to the project site is provided via 134th Street SE along the northern boundary of the site. The site is more generally located in portions of the NW ¼ and NE ¼ of Section 36, Township 28 North, Range 6 East, W.M., Snohomish County, Washington.

The site generally descends from the northeastern property corner to the southwest with a total relief of approximately 75 feet. Surface runoff primarily sheet flows southwesterly across the property toward the adjacent parcels to the west and south. The parcels to the south contain a gravel trench along the north property boundaries which collects runoff from the project site and conveys it to a detention pond serving the Trombley Hill development. A downstream analysis has been completed as part of this report in Section 3 to confirm downstream capacity for developed site runoff.

SECTION 2 – EXISTING CONDITIONS SUMMARY

The *Belmont Terrace PRD* project site is comprised of one parcel (Tax Parcel # 28063600101900) with a total area of approximately 4.75 acres. It is located within the French Creek Drainage Basin, part of the Snohomish Watershed, WRIA 07. The site is bordered by single-family residences on all sides with access off of 134th Street SE to the north. The Toivo Ridge neighborhood borders the site to the south and provides a discharge point for stormwater runoff. The existing parcel contains a single-family residence and its associated structures. The parcel has a large, fenced lawn area adjacent to the frontage road. The southern portion of the parcel consists of unmaintained vegetation.

The general soil classification of the developable portion of the site is characterized by the Natural Resources Conservation Service (NRCS) as Tokul gravelly medial loam, with 0 to 15 percent slopes. A geotechnical engineering study was performed by Terra Associates, Inc. to evaluate the suitability of the site for the proposed development of a residential subdivision. They reported that observed soils were "glacial deposits comprised predominantly of medium dense to dense silty sand with gravel interpreted to be weathered till overlying unweathered till deposits consisting of dense to very dense, moderately- to strongly-cemented silty sand with gravel and occasional cobbles." The site is not a seismic hazard area and the developable portion of the site is not an erosion hazard area. Infiltration/LID measures are not feasible on this site due to the low permeability of the glacial till soils. Overall, it was determined that there are no geotechnical considerations that preclude development of the site as currently planned. A copy of the geotechnical report along with the NRCS Web Soil Survey data are provided in Appendix A.

The site generally descends from the northeastern property corner to the southwest with a total relief of about 75 feet. Surface runoff primarily sheet flows southwesterly across the property toward the adjacent parcels to the west and south. The parcels to the south (part of the Toivo Ridge deveopment) contain a gravel trench along the north property boundaries which collects runoff from the project site and conveys it southeast to a detention pond serving the Trombley Hill development. A downstream analysis has been completed as part of this report in Section 3 to confirm downstream capacity for developed site runoff. There are no wetlands or streams on-site. See Figure 2 for a map of existing site conditions.

SECTION 3 – OFF-SITE ANALYSIS

This section summarizes the analysis of the onsite and offsite drainage conditions for the project. The methodology of the analysis and reporting of these conditions is in general accordance with the Department of Ecology's 2014 Stormwater Management Manual for Western Washington (SWMM). This analysis includes research of available information, a site visit, an upstream analysis, and a downstream analysis. Research sources include aerial photography, GIS information, survey data, and as-built plans for the adjacent Toivo Ridge neighborhood provided by the City of Monroe.

Site Visit

A site visit was completed on January 23, 2019 at 12:00 PM to observe drainage conditions in the project vicinity and to inspect the downstream conveyance system and assess its capacity for mitigated site discharge. The weather was 48° and partly cloudy. There had been showers earlier in the day totaling 0.60" of precipitation and 0.42" of precipitation had fallen the previous day.

Upstream Analysis

Runoff from the northwest portion of the adjacent property to the east flows onto and through the project site toward the southwest as sheet flow or shallow, subsurface flow. This property is a large residential parcel consisting of a home, associated structures, and a large pasture area. The tributary basin is approximately 2.12 acres of pasture.

The 134th Street SE right-of-way fronts the northern property boundary of the site. The properties to the north of the right-of-way are part of the *Sweetbriar at Monroe* development. Runoff from these properties is collected and conveyed to a detention vault serving the development. Runoff from the property to the northeast is collected in a ditch along the north side of 134th Street SE and conveyed west until discharging to the stormwater system serving *Sweetbriar at Monroe*. 134th Street SE along the frontage of the property is currently a half-street road section which drains north into the Sweetbriar at Monroe stormwater system. Thus, there is no upstream runoff from properties to the north.

The properties to the west and south are at lower elevations than the project site and thus no upstream runoff from these areas flows onto the site.

Downstream Analysis

Site runoff is intercepted by a gravel trench with a perforated pipe located approximately 5 feet south of the southern property boundary. The trench was constructed as part of the Toivo Ridge development. The perforated pipe discharges to an existing catch basin near the southwest property corner. This structure is the connection point for mitigated project runoff. The structure discharges runoff south through a series of catch basins and underground conveyance pipes. The conveyance system continues to convey flows west in the 137th St SE right-of-way and then southeast in the Rainier View Rd SE right-of-way before discharging to the existing detention pond in Tract 955 of Trombley Hills through a rock armored outfall. The detention pond discharges to the southwest and outfalls to a wetland in a forested area which ultimately discharges to Cripple Creek. See Appendix D for photos, a downstream map, and a summary table of the downstream system.

The downstream conveyance system appears to be properly functioning with no observed evidence of erosion or insufficient capacity. Runoff from the project will meet flow control standards set forth by the Department of Ecology 2014 Stormwater Management Manual for Western Washington. This will result in decreased peak flows leaving the site for all major storm events and therefore is not expected to have an adverse impact on the downstream system.

SECTION 4 – Permanent Stormwater Control Plan

Performance Standards, Goals and Facility Proposals

The storm drainage analysis and facilities design for this project are proposed in general accordance with the 2012 Department of Ecology Stormwater Management Manual for Western Washington, as amended in December 2014, as specified by current Monroe Municipal Code (MMC), section 15.01.025. The project is classified as New Development and will result in greater than 5,000 square-feet of new impervious surface, therefore all nine Minimum Requirements for stormwater management specified by the manual are applicable.

The hydrologic analysis of the runoff conditions for the project site was performed using the Western Washington Hydrologic Model 2012 (WWHM) software to generate peak design flow rates and volumes. A combined detention/water quality pond is proposed in the southern portion of the site to treat and detain runoff. Appendix B contains the WWHM model results for the proposed stormwater controls and water quality facilities proposed for the project. See Figure 7 for the stormwater pond details.

Pre-developed Site Hydrology

There is upstream runoff from 2.12 acres that flows through the project site. This area is to the east of the project boundary and enters the site as sheet flow and shallow, subsurface flow. Runoff from this upstream area will be collected directly into the project's conveyance system, routed to the pond, treated, and detained along with the rest of the project's developed runoff. This basin will be modeled in its existing condition as there are no land cover modifications proposed. The total developed area for on-site and frontage improvement is 5.01 acres and will be modeled as forest for the pre-developed condition. Table 4.1 shows the pre-developed land use inputs used in the WWHM model and Table 4.2 summarizes the resulting peak design runoff rates. See Figure 4 for pre-developed drainage basins.

Table 4.1 – Pre-developed Drainage Sub-basins

Basin	Land Use Area (ac)				
	Forested	Grass	Pasture	Impervious	Total
Predeveloped Site	5.01	0.00	0.00	0.00	5.01
Upstream	0.00	0.00	2.12	0.00	2.12
Total Area (ac)	**5.01**	**0.00**	**2.12**	**0.00**	**7.13**

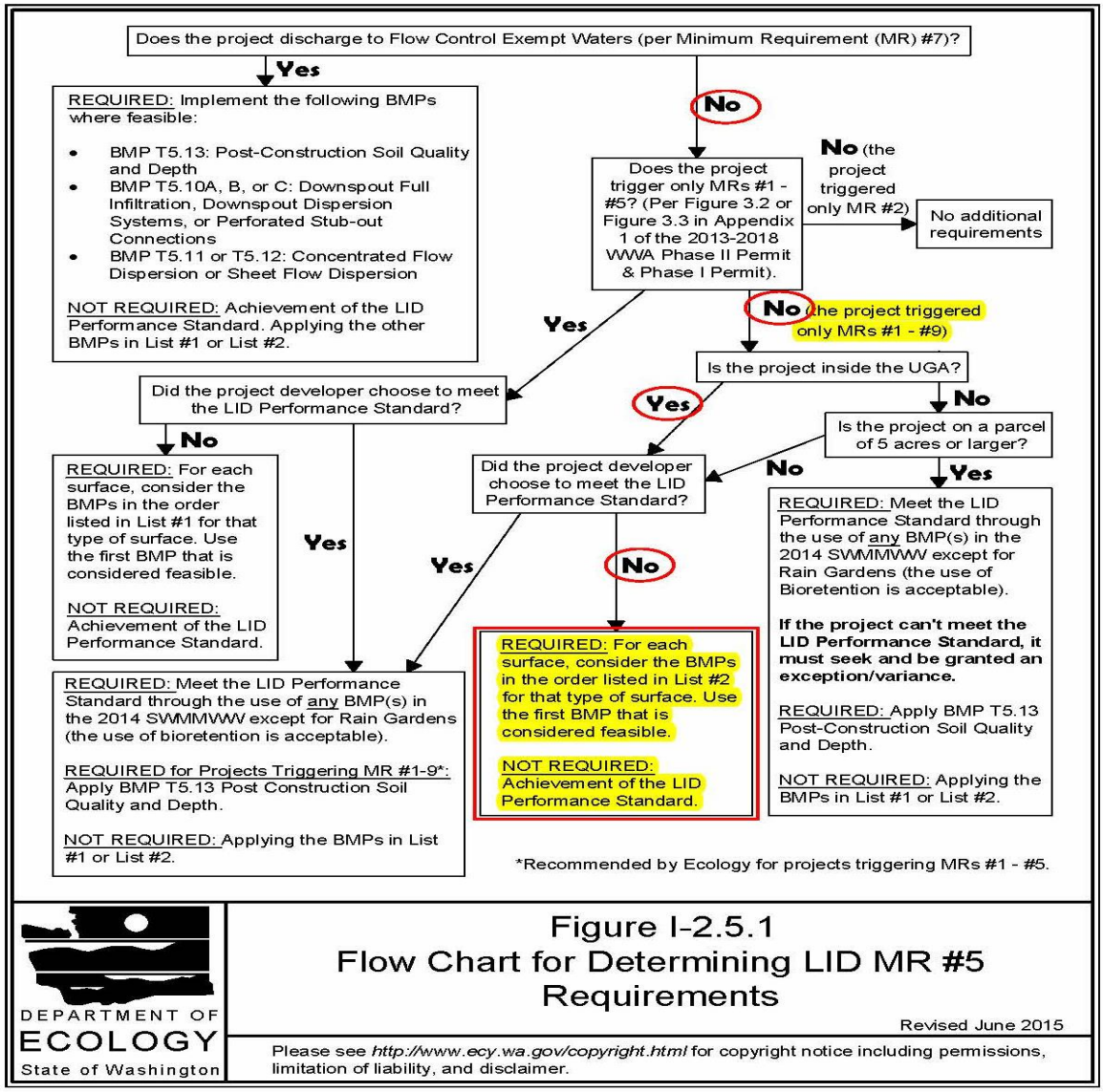
Table 4.2 – Pre-developed Peak Flows (at WWHM point of compliance)

Event	Flow Rate (cfs)
2-yr	0.27
10-yr	0.59
25-yr	0.81
50-yr	1.00
100-yr	1.22

On-Site Stormwater Management

Minimum Requirement #5 addresses the application of on-site stormwater management BMPs with the intent to "infiltrate, disperse, and retain stormwater runoff on-site to the extent feasible without causing flooding or erosion impacts." Requirements for this project are specified on Table I-2.5.1 and Figure I-2.5.1. These are included here with the relevant text highlighted.

Figure I-2.5.1 Flow Chart for Determining LID MR #5 Requirements



2014 Stormwater Management Manual for Western Washington

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Table I-2.5.1 On-Site Stormwater Management Requirements for Projects Triggering Minimum Requirements #1 - #9

Project Type and Location	Requirement
New development on any parcel inside the UGA, or new development outside the UGA on a parcel less than 5 acres	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth (p.911); or List #2 (applicant option).
New development outside the UGA on a parcel of 5 acres or larger	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth (p.911).
Redevelopment on any parcel inside the UGA, or redevelopment outside the UGA on a parcel less than 5 acres	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth (p.911); or List #2 (applicant option).
Redevelopment outside the UGA on a parcel of 5 acres or larger	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth (p.911).
Note: This table refers to the Urban Growth Area (UGA) as designated under the Growth Management Act (GMA) (Chapter 36.70A RCW) of the State of Washington. If the Permittee is located in a county that is not subject to planning under the GMA, the city limits shall be used.	

The feasibility of the BMPs in DOE List #2 have been evaluated for the *Belmont Terrace PRD* project as a new development inside the UGA. BMPs listed were considered in order for each type of surface to determine if their use/application for this project was feasible based on the following criteria:

1. Design criteria, limitations, and infeasibility criteria identified for each BMP in this manual; and
2. Competing Need Criteria listed in Chapter V-5 – On-Site Stormwater Management.

Lawn and landscaped areas:

1. **Post-Construction Soil Quality and Depth in accordance with BMP T5.13**

   This BMP is feasible. All soils in lawn and landscaped areas will meet the design guidelines of BMP T5.13. This will be accomplished through one or more of the following implementation methods identified in the manual:

   a. retention of undisturbed native vegetation and soil, or
   b. amendment of existing site topsoil, or
   c. stockpiling and reuse of existing topsoil, or import of approved topsoil mix.

Roofs:

1. **Full Dispersion in accordance with BMP T5.30, or Downspout Full Infiltration Systems in accordance with BMP T5.10A**

These BMPs are not feasible. The site plan, which is in accordance with City of Monroe PRD requirements, does not retain the minimum amount of native vegetation required to apply the Full Dispersion BMP. There are also no feasible locations on site where the required vegetated flowpath length can be accommodated. The glacial till soil on site exhibits low permeability and is not a suitable receptor for infiltration or retention facilities.

2. **Bioretention facilities in accordance with BMP T7.30**

   This BMP is not feasible. The glacial till soil on site exhibits low permeability and is not a suitable receptor for infiltration or retention facilities.

3. **Downspout Dispersion Systems in accordance with BMP T5.10B**

   This BMP is not feasible. The proposed lots, designed in accordance with City of Monroe PRD requirements, are not large enough to accommodate the vegetated flow path required for dispersion.

4. **Perforated Stub-out Connections in accordance with BMP T5.10C**

   This BMP is not feasible. The glacial till soil on site exhibits low permeability and is not a suitable receptor for infiltration or retention facilities.

Other Hard Surfaces:

1. **Full Dispersion in accordance with BMP T5.30**

   This BMP is not feasible. The site plan, which is in accordance with City of Monroe PRD requirements, does not retain the minimum amount of native vegetation required to apply the Full Dispersion BMP. There are also no feasible locations on site where the required vegetated flowpath length can be accommodated.

2. **Permeable Pavement in accordance with BMP T5.156**

   This BMP is not feasible. The glacial till soil on site exhibits low permeability and is not a suitable receptor for infiltration or retention facilities.

3. **Bioretention facilities in accordance with BMP T7.30**

   This BMP is not feasible. The glacial till soil on site exhibits low permeability and is not a suitable receptor for infiltration or retention facilities.

4. **Sheet Flow Dispersion in accordance with BMP T5.12, or Concentrated Flow Dispersion in accordance with BMP T5.11**

   This BMP is not feasible. The proposed lots, designed in accordance with City of Monroe PRD requirements, are not large enough to accommodate the vegetated flowpath required for dispersion.

The Geotechnical Report prepared by Terra Associates, Inc. (see Appendix A) specifically addresses the application of on-site stormwater management BMPs. In the Infiltration section of the report, Terra concludes that, "Based on our study, it is our opinion that on-site infiltration is not a feasible alternative for management of site stormwater due to the presence of relatively-impermeable till and till-like soils at relatively shallow depths beneath the ground surface."

Developed Site Hydrology

The Standard Flow Control Requirement, part of Minimum Requirement #7, will be applied and states that, "Stormwater discharges shall match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow."

Developed site conditions within the study area were modeled based on the sub-basin configurations shown in Figure 5 and the land use covers summarized in Table 4.3. The residential lots were modeled based on an expected maximum 60 percent impervious coverage as allowed by Monroe Municipal Code (MNC) Bulk Requirements Chapter 18.10.140. Impervious road and sidewalk surfaces, both on-site and frontage, were calculated from the proposed footprint shown on the improvement plans. The remaining lot and open space area was modeled as grass. There is a small area of frontage improvements that cannot drain to the pond due to grade restrictions and is modeled as bypass area in WWHM. The upstream basin was modeled in its existing condition as there is no land cover modification proposed for this area.

The combined water quality/detention pond proposed for this project contains 8.0 feet of live storage and 4.0 feet of dead storage. The provided detention volume at the top of the flow control riser is 1.64 acre-feet, exceeding the 1.53 acre-feet required as calculated in WWHM. Flow control is provided by an 18" riser pipe with a three-orifice design used to meet the applicable standards.

Table 4.3 shows the developed land use inputs used in the WWHM model. Table 4.4 summarizes the peak design flow rates in the developed condition, both unmitigated and mitigated.

Table 4.3- Developed Drainage Sub-basins

Basin	Land Use Area (ac)				
	Forested	Grass	Pasture	Impervious	Total
Developed (To Pond)	0.00	2.17	0.00	2.73	4.90
Upstream Flow-through	0.00	0.00	2.12	0.00	2.12
Frontage Bypass	0.00	0.01	0.00	0.10	0.11
Total Area (ac)	**0.00**	**2.18**	**2.12**	**2.83**	**7.13**

Table 4.4 – Developed Peak Flows

Event	Unmitigated Pond Inflow (cfs)	Mitigated Pond Discharge (cfs)	Frontage Bypass (cfs)	Peak Flow at Point of Compliance (cfs)
2-yr	1.81	0.14	0.05	0.17
10-yr	3.26	0.25	0.09	0.28
25-yr	4.18	0.32	0.11	0.35
50-yr	4.95	0.39	0.12	0.41
100-yr	5.80	0.46	0.14	0.48

Conveyance System Analysis and Design

The project proposes to collect on-site runoff and convey it to the stormwater pond prior to release offsite. Surface runoff will be collected by roof drains, roadway and yard inlets, and a system of below grade pipes on the site. These systems convey runoff to the onsite combined water quality/detention pond for treatment and flow control.

An analysis of the capacity of the conveyance facilities for the project has been performed using a standard backwater approach. Design flows for this conveyance analysis were generated using the Rational Method for a 100-year design storm. The completed backwater analysis confirms that the proposed conveyance systems as designed contain the Rational design flows without overtopping catch basin/manhole inlets. The rational and backwater calculations are provided in Appendix C of this report, and Figure 6 displays the sub-catchment areas used for the Rational calculations.

Water Quality Treatment

Basic water quality treatment is required for surface water runoff from all new pollution generating surfaces created with development of the site per Minimum Requirement #6. Treatment will also be provided for flows from the upstream basin because its runoff will be mixed with developed site runoff. The minimum required wetpool volume calculated from WWHM (91% of total runoff volume) is 0.4555 acre-feet, or 19,842 cubic feet. Water quality treatment will be provided through the application of a wetpond in the eastern cell of the stormwater pond. There is 4.0' of dead storage in the pond which provides approximately 20,907 cubic feet of wetpond volume.

The wetpond was designed in general accordance with Chapter V-10 of the SWMM. Table 4.5 summarizes the design conditions of the water quality facility. The wetpond has 3H:1V side slopes and is divided into two cells separated by a berm. The top of the berm is one foot below the water quality design water surface. The first cell includes one-foot of sediment storage and contains approximately 26% of the total water quality volume.

Table 4.5 – Water Quality Pond Design

Wetpond Information	
W/Q Volume Required	19,842 cf
W/Q Volume Provided	20,907 cf
Cell 1 Depth	4 ft
Cell 2 Depth	4 ft
WQ elevation	312.00

SECTION 5 – Construction Stormwater Pollution Prevention Plan

Storm Water Pollution Prevention Plan (SWPPP)

1. *Mark Clearing Limits*
   To prevent disturbance of project areas not designated for construction, a construction clearing limits fence or silt fence will be installed by the Contractor along the perimeter of the project site to protect existing native area outside of the mitigation area. These fences will be installed in accordance with the details and specifications provided in the Plans prior to any clearing and grading activities.

2. *Establish Construction Access*
   Heavy truck and equipment access during construction shall be limited to locations from 191st Ave SE. The contractor shall employ appropriate BMP measures to prevent transport of sediment offsite by motor vehicles.

3. *Control Flow Rates*
   The contractor will be responsible for installing temporary erosion control BMP's to control the release rate and water quality of surface water from active construction areas.

4. *Install Sediment Controls*
   On-site sediment retention will be controlled by a combination of silt fences, temporary interceptor trenches, and the proposed detention pond as shown on the Plans. The contractor shall inspect and provide regular maintenance of these facilities throughout the duration of construction to ensure maximum sediment control.

5. *Stabilize Soils*
   Temporary and permanent cover measures will be provided by the Contractor to protect disturbed areas. Straw mulching is typically used to provide temporary protection from erosion at exposed soil areas. Plastic covering may also be used in order to protect cut and fill slopes, and/or to encourage grass growth in newly seeded areas. Disturbed areas that remain unworked for at least 7 days will be seeded and mulched to provide permanent cover measure and to limit erosion potential.

   Water will be used by the Contractor as allowed by local agency regulations and applicable SWMM standards to prevent wind transport of exposed soils. Exposed soils will be sprayed until wet and re-sprayed as needed during dry weather periods.

6. *Protect Slopes*
   The project does not require any disturbance of soils within steep slope or erosion hazard areas. Temporary and permanent seeding to stabilize exposed soil areas is expected to be sufficient for protecting on-site slopes—whether constructed or at disturbed native areas. Plastic covering may also be used to protect cut and fill slopes if seasonal limitations warrant and/or to encourage grass growth in newly seeded areas. The contractor shall take all practical efforts including installation of temporary interceptor ditches to direct potential storm water runoff away from the top of on-site slopes.

7. *Protect Drain Inlet*
   All storm drain inlets made operable during construction or otherwise existing in the vicinity of work areas shall be protected using pre-manufactured filter fabric catch basin inserts to protect against construction storm water runoff entering the conveyance system. The Contractor will be responsible for maintenance of all temporary sediment control BMP's during construction, including removal of accumulated sediment, as well as for the ultimate removal of these controls and remaining accumulated sediment upon completion of construction.

8. *Stabilize Channels and Outlets*
   Methods of protection may include silt fence installation and maintenance, catch basin inserts, and temporary interceptor ditches. Vegetated areas shall be maintained whenever possible or practical to provide for natural filtration of construction storm water discharges.

9. *Control Pollutants*
   Special provisions shall be taken to reduce the risk of pollutant contamination from the construction access, concrete handling/wash areas, and sawcutting/surfacing activities. Vehicle maintenance shall only be performed at approved on-site areas and only after proper containment devices are in place downstream of those areas. Any flammable or otherwise hazardous liquids shall be stockpiled only at the approved construction staging area.

10. *Control Dewatering*
    Temporary dewatering efforts may be required to facilitate some elements of construction such as storm drainage and utilities installation. Any such dewatering volumes encountered will be collected and controlled using pumps and sediment traps or tanks. Discharge from these controlled onsite facilities will be dispersed to approved areas of native vegetation or otherwise treated using setting tanks or other mechanical filtration facilities prior to release to downstream systems as required to conform with General Construction Stormwater permit standards.

11. *Maintain BMPs*
    All TESC measures will be inspected and maintained on a regular basis following the maintenance requirements identified for each in the Plans and/or the project's Storm Water Pollution Prevention Plan (SWPPP). An ESC supervisor will be designated by the Contractor and the name, address and phone number of the ESC supervisor will be given to the regulatory jurisdiction prior to the start of construction.

    The ESC supervisor will inspect the site at least once a month during the dry season, weekly during the wet season, and within 24 hours of each runoff-producing storm event. An ESC maintenance report will be used as a written record of all maintenance in accordance with the project SWPPP

12. *Manage the Project*

    The Contractor will be responsible for the phasing of erosion and sediment controls during construction so that they are adequately coordinated with all construction activities. The Contractor will be responsible for maintenance of all temporary sediment control BMP's during construction, including removal of accumulated sediment, as well as for the ultimate removal of these controls and cleaning of existing permanent storm drainage facilities upon completion of construction.

13. *Protect Low Impact Development BMPs*

The project geotechnical engineered determined that the onsite soils are not favorable for infiltrative BMPs. As such, no low impact development BMPs are proposed with this project. No special protection is required.

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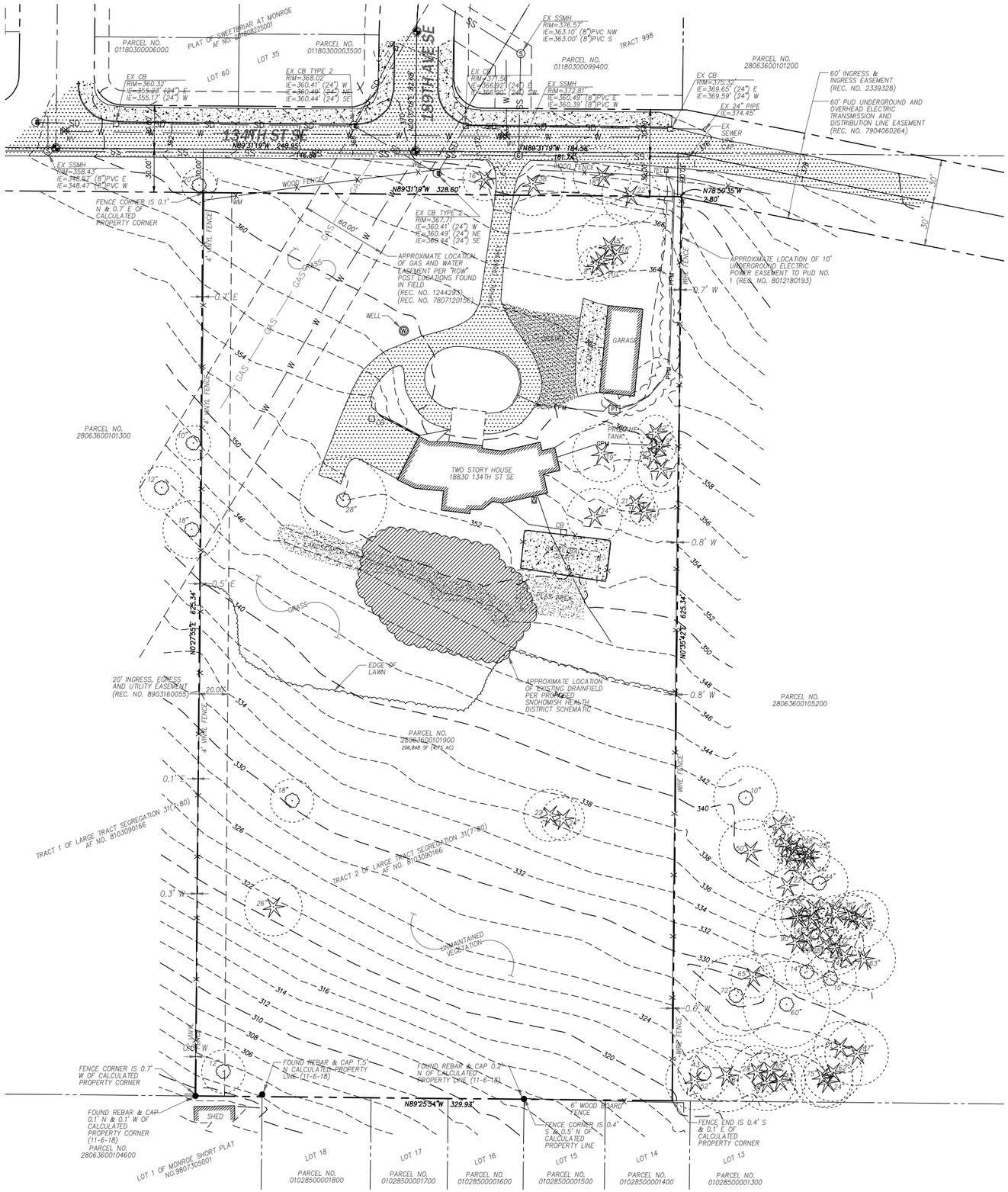
FIGURES



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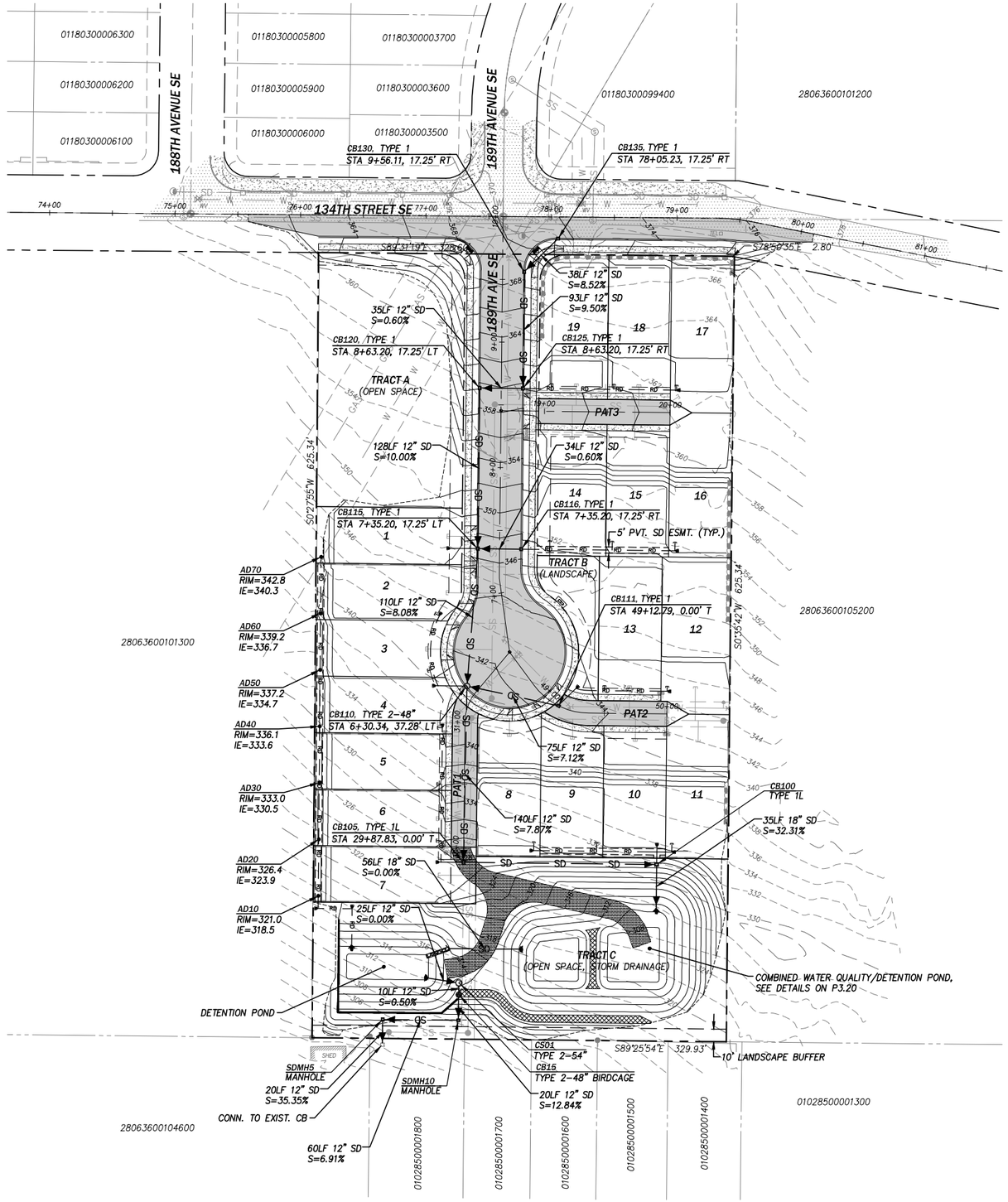
0 40 80
PLAN IN FEET

FIGURE 2 - EXISITING SITE CONDITIONS



LEGEND

- MSE RETAINING WALL
- ROCKERY
- EXIST. TOPOGRAPHIC CONTOUR
- PROPOSED GRADE CONTOUR
- TYPE 1 STORM DRAINAGE CATCH BASIN
- TYPE 2 STORM DRAINAGE CATCH BASIN
- YARD DRAIN
- STORM DRAINAGE PIPE
- ROOF DRAIN CONNECTION

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FIGURE 3 - DEVELOPED SITE CONDITIONS

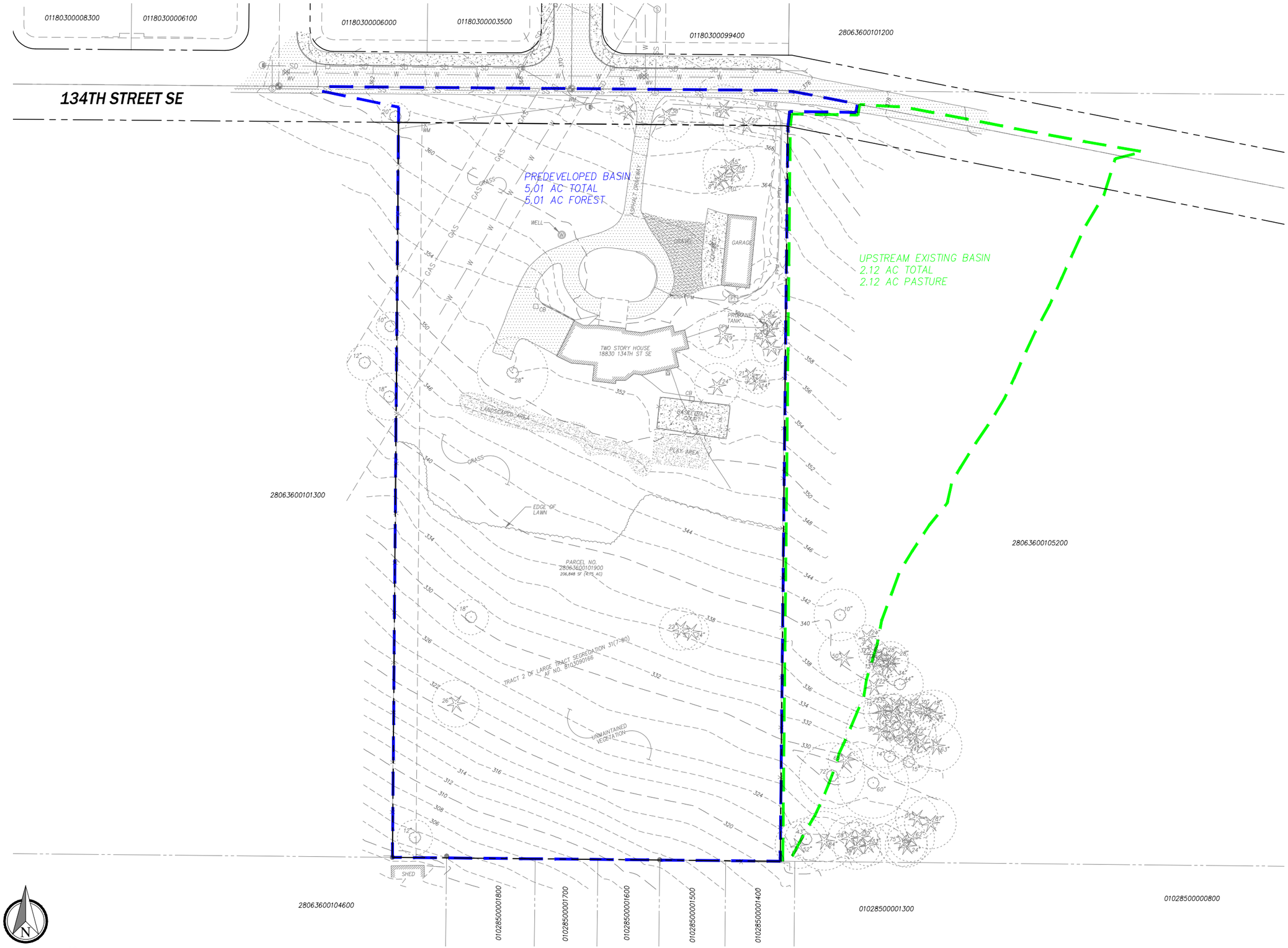

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FIGURE 4 - PREDEVELOPED DRAINAGE BASINS

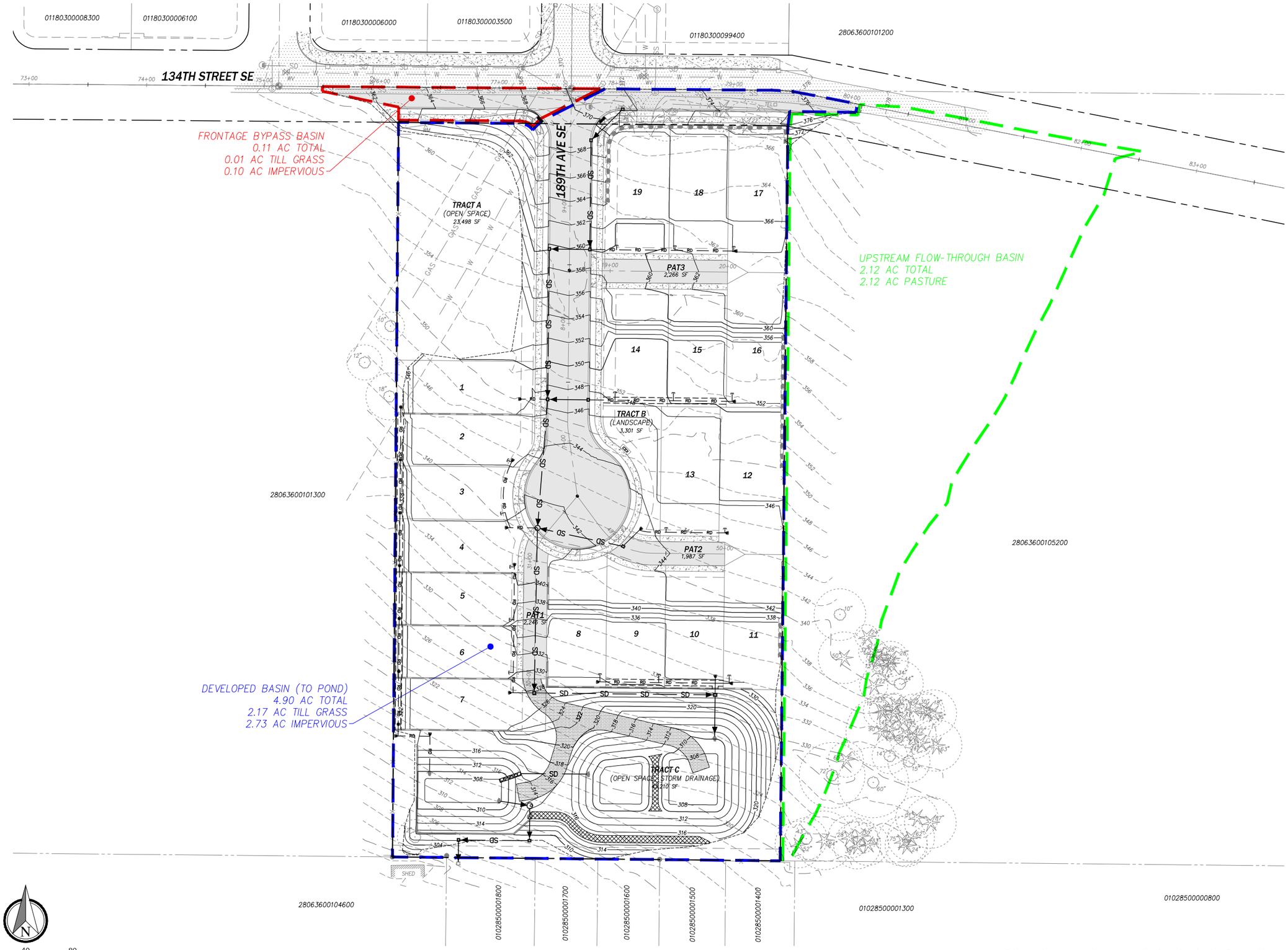

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FIGURE 5 - DEVELOPED DRAINAGE BASINS

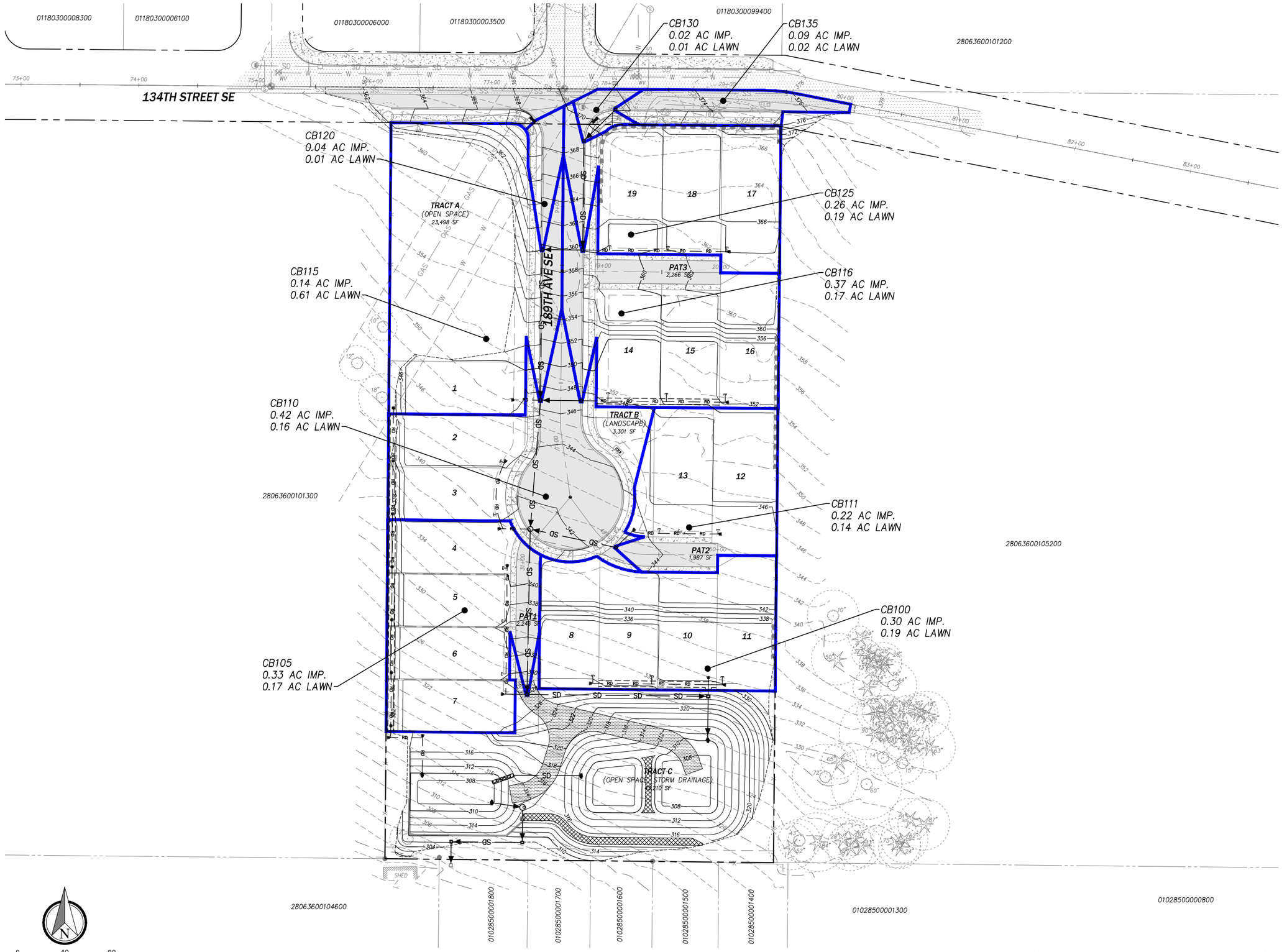

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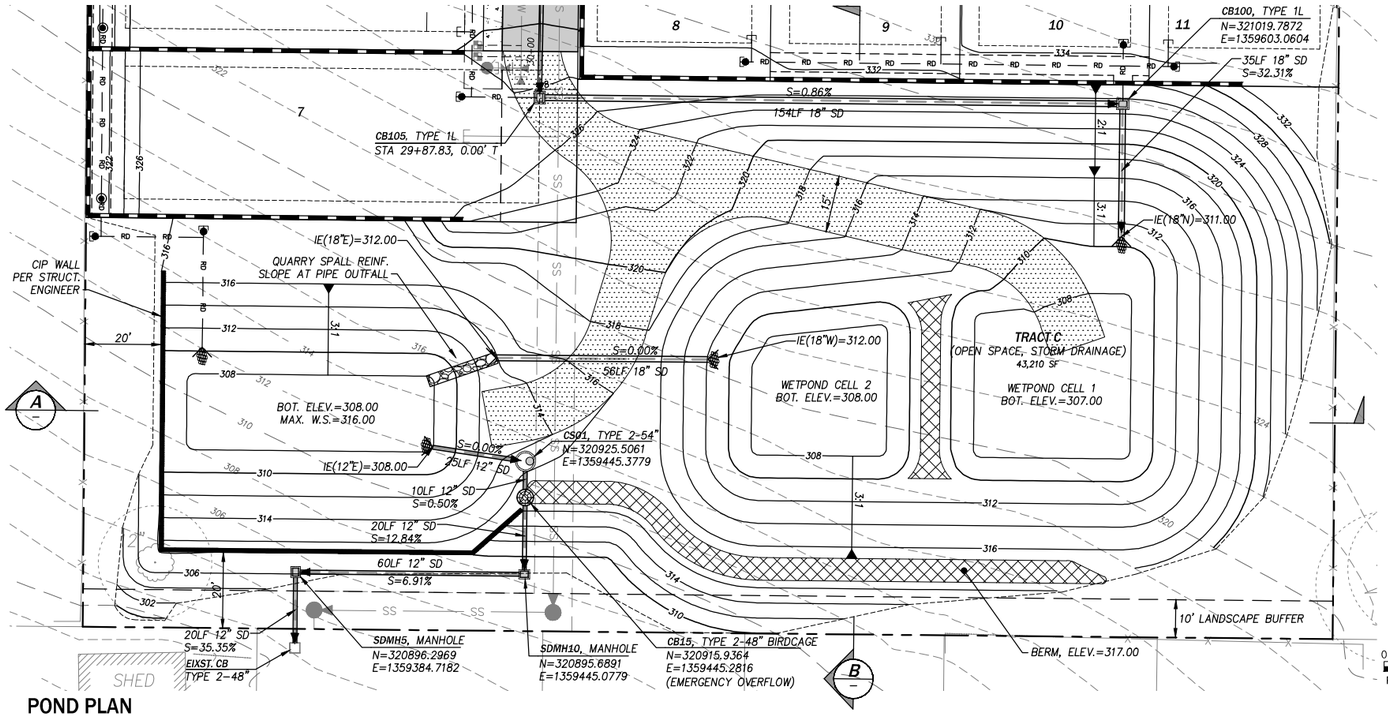
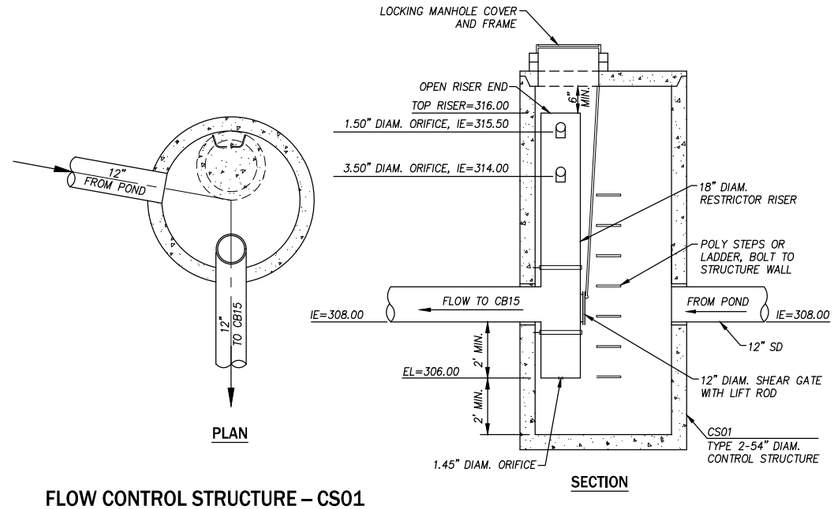
FIGURE 6 - CONVEYANCE SUB-BASINS



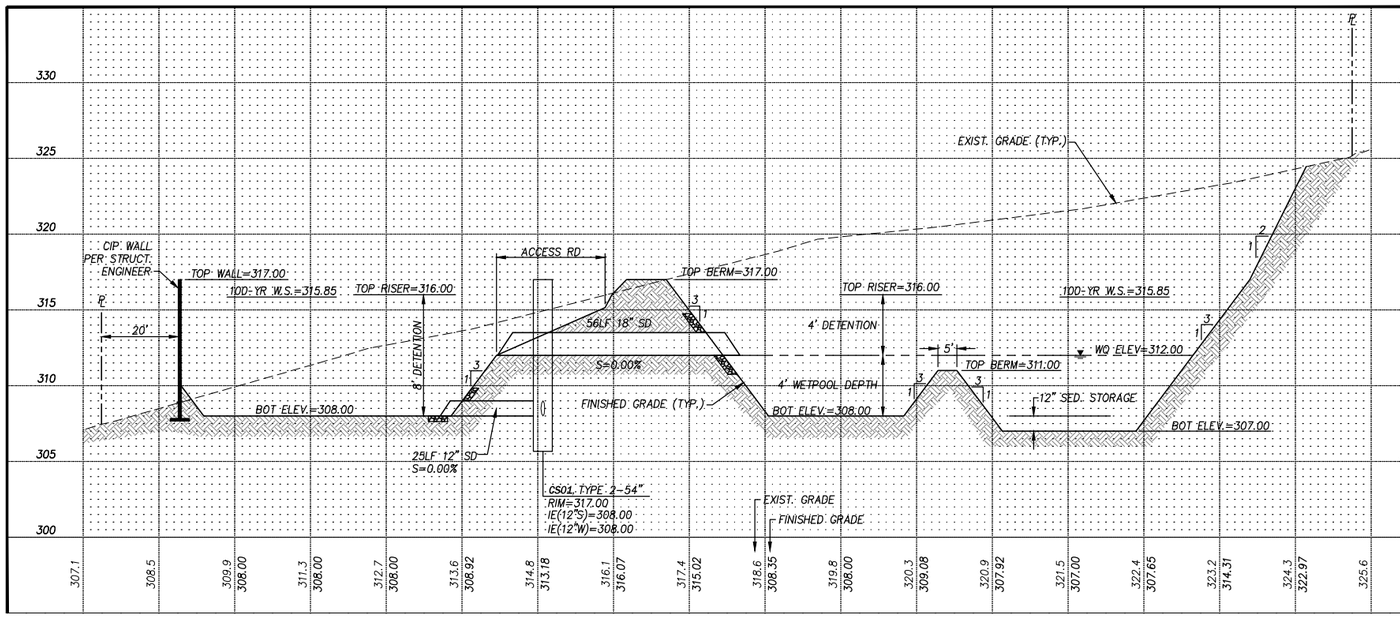
POND PLAN

SCALE: AS NOTED

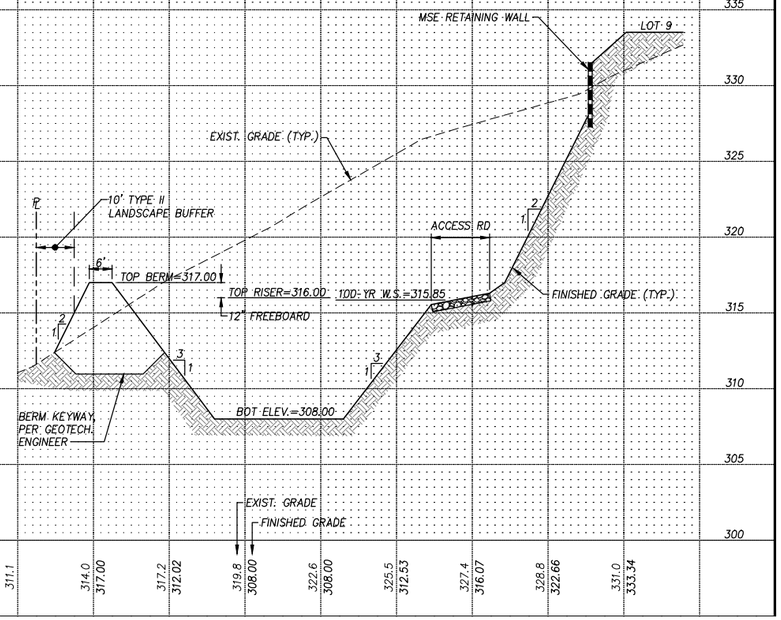


FLOW CONTROL STRUCTURE – CS01

NOT TO SCALE



SECTION A



SECTION B

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VERT. IN FEET
0 20 40
HORIZ. IN FEET

FIGURE 7 - STORMWATER POND DETAILS

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APPENDIX A

NRCS SOILS REPORT AND GEOTECHNICAL REPORT

Map Scale: 1:1,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Snohomish County Area, Washington
Survey Area Data: Version 20, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 29, 2016—Oct 10, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

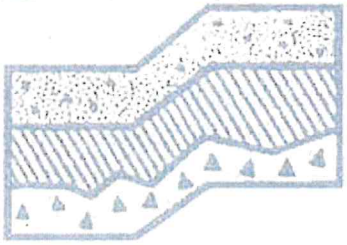
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
72	Tokul gravelly medial loam, 0 to 8 percent slopes	3.1	61.1%
73	Tokul gravelly medial loam, 8 to 15 percent slopes	2.0	38.9%
Totals for Area of Interest		**5.1**	**100.0%**

GEOTECHNICAL REPORT

Barajas Property
18830 – 134th Street SE
Monroe, Washington

Project No. T-8064



Terra Associates, Inc.

Prepared for:

D.R. Horton
Kirkland, Washington

December 4, 2018

TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

December 4, 2018
Project No. T-8064

Ms. Katie Stecks
D.R. Horton
11241 Slater Avenue NE, Suite 200
Kirkland, Washington 98033

Subject: Geotechnical Report
Barajas Property
18830 – 134th Street SE
Monroe, Washington

Dear Ms. Stecks:

As requested, we conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design and construction.

The soils observed in our subsurface explorations are glacial deposits comprised predominantly of medium dense to dense silty sand with gravel interpreted to be weathered till overlying unweathered till deposits consisting of dense to very dense, moderately- to strongly-cemented silty sand with gravel and occasional cobbles. We observed light to moderate seepage of perched groundwater in eight of the nine test pits.

In our opinion, there are no geotechnical conditions that would preclude development of the site, as currently planned. The residences can be supported on conventional spread footings bearing on competent native soils on structural fill placed on the competent native soils. Floor slabs and pavements can be similarly supported.

Detailed recommendations addressing these issues and other geotechnical design considerations are presented in the attached report. We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

John C. Sadler, L.E.G., L.H.G.
Project Manager/Senior Engineering Geologist

12-4-18

Carolyn S. Decker, P.E.
Project Engineer

12220 113th Avenue NE, Ste. 130, Kirkland, Washington 98034
Phone (425) 821-7777 • Fax (425) 821-4334

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Geotechnical Report
Barajas Property
18830 – 134th Street SE
Monroe, Washington

1.0 PROJECT DESCRIPTION

The proposed project is a residential subdivision. An unreferenced, undated site plan provided to us indicates the development will consist of 22 single-family lots with associated infrastructure and access improvements. The site will be accessed off of 134th Street SE by a new roadway that terminates at a cul-de-sac in the south-central portion of the site. Stormwater runoff collected from the development will be conveyed to a detention facility in the southwestern portion of the site. The plan does not indicate the type of detention facility that will be used. Site grading and building plans are currently not available. Based on the sloping surface gradients, we expect that moderate cuts and fills will be required to establish building pad and roadway elevations.

We expect that the residences will be two- to three-story wood-frame structures with the main floor levels constructed at grade or framed over a crawl space. We anticipate that foundation loads would be relatively light, in the range of 2 to 3 kips per foot for bearing walls and 25 to 50 kips for isolated columns.

The recommendations contained in the following sections of this report are based on these design features. We should review design drawings and specifications as they are developed to verify that our recommendations are valid for the proposed construction, and to amend or modify our report, as necessary.

2.0 SCOPE OF WORK

We explored subsurface conditions at the site in nine test pits excavated to depths about four to eight feet below ground surface using a track-mounted excavator. Using the results of our subsurface exploration and laboratory testing, analyses were undertaken to develop geotechnical recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions
- Geologic hazards per the City of Monroe Municipal Code
- Seismic design parameters per the 2015 International Building Code (IBC)
- Site preparation and grading
- Excavations
- Foundations

- Slab-on-grade floors
- Stormwater facilities
- Infiltration feasibility
- Drainage
- Utilities
- Pavements

It should be noted that recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment is beyond Terra Associates' purview. A building envelope specialist or contactor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The site is an approximately 4.76-acre parcel located south of and adjacent to 134th Street SE, approximately 670 feet to 1,000 feet west of the intersection with 191st Avenue SE in Monroe, Washington. The site location is shown on Figure 1.

A single-family residence and a detached garage occupy the north-central and northeastern portions of the site, respectively. Existing surface gradients generally slope down to the south at gentle to moderate inclinations. Vegetation in the northern portion of the site consists primarily of grass lawn and landscape trees and shrubs. The southern portion of the site is vegetated primarily with thick brush and scattered mature coniferous and deciduous trees.

We observed a localized wet area in the east-central portion of the site. The wet area is located immediately downgradient from a corrugated plastic pipe emerging from a pad of cobble-size rocks that appears to be a surface discharge point for one or more drains installed at the site.

3.2 Soils

The soils observed in our subsurface explorations are glacial deposits comprised predominantly of medium dense to dense silty sand with gravel interpreted to be weathered till overlying unweathered till deposits consisting of dense to very dense, moderately- to strongly-cemented silty sand with gravel and occasional cobbles. Eight of the nine test pits terminated in dense to very dense till encountered below depths of about 2.5 to 6 feet. Test Pit TP-1 terminated in a dense, weakly to moderately cemented, outwash-like sand with silt and gravel unit that is interpreted to be an ice-contact deposit. We were unable to determine the vertical extent of the sand with silt and gravel unit due to localized groundwater seepage and caving.

We observed about 1 to 3 feet of loose to medium dense silt to sandy silt containing trace to scattered amounts of gravel in Test Pits TP-6 and TP-7. The silt unit overlies till and till-like soils at both locations and is also interpreted to be an ice contact deposit.

The *Surficial geologic map of the Skykomish and Snoqualmie Rivers area, Snohomish and King Counties, Washington*, by D.B. Booth, 1990, shows the site mapped as Vashon till (Qvt). The dense to very dense silty sand with gravel observed in the test pits is consistent with this geologic unit.

Detailed descriptions of the subsurface conditions we observed in our site explorations are presented on the Test Pit Logs in Appendix A. The approximate test pit locations are shown on Figure 2.

3.3 Groundwater

We observed light to moderate groundwater seepage in 8 of the 9 test pits that was generally perched above the till between depths of about 2 and 2.5 feet. Exceptions to this include moderate groundwater seepage observed between about 3 and 4 feet in Test Pit TP-1 that appeared to be perched above the dense outwash-like sand with silt and gravel, and in Test Pit TP-9 where groundwater is perched on dense till-like soil about 0.3 feet below ground surface.

The occurrence of shallow perched groundwater is typical for sites underlain by relatively impermeable till and till-like soils. We expect that perched groundwater levels and flow rates at the site will fluctuate seasonally, with highest levels typically developing during the wet winter months (October through May).

3.4 Geologic Hazards

We evaluated site conditions for the presence of geologic hazards as designated by Chapter 20.05.120 (Geologically hazardous areas) of the City of Monroe Municipal Code (MMC). Geologically hazardous areas are defined by the MMC as areas susceptible to erosion, sliding, earthquake, or other geological events and include erosion hazard areas, landslide hazard areas, seismic hazard areas, and other geological events including tsunami, mass wasting, debris flows, rock falls, and differential settlement.

3.4.1 Erosion Hazard Areas

Section 20.05.120.B.1 of the MMC defines erosion hazard areas as "...at least those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having "severe" or "very severe" rill and inter-rill erosion hazard."

The Natural Resources Conservation Service (NRCS) has mapped the site soils as *Tokul gravelly medial loam, 0 to 8 percent slopes* and *Tokul gravelly medial loam, 8 to 15 percent slopes.* The erosion hazard of both soil types is described by the NRCS as slight, which does not meet the definition of an erosion hazard area given above.

We did not observe any indications of significant active erosion at the site; however, the site soils will be susceptible to erosion when exposed during development. In our opinion, the erosion potential of the site soils would be adequately mitigated with proper implementation and maintenance of Best Management Practices (BMPs) for erosion prevention and sedimentation control in the planned development area. BMPs for erosion prevention and sedimentation control will need to be in place prior to and during site development, and should be maintained until permanent site stabilization measures are in place. All BMPs for erosion prevention and sedimentation control should conform to City of Monroe requirements.

3.4.2 Landslide Hazard Areas

Section 20.05.120.B.2 of the MCC defines landslide hazard areas as "...areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Examples of these may include, but are not limited to, the following:

a. Areas of historic failure, such as:
   i. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "severe" limitation for building site development.
   ii. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Department of Natural Resources.

b. Areas with all three of the following characteristics:
   i. Slopes steeper than 15 percent.
   ii. Hillsides intersecting geologic contacts with a relatively permeable sediment overlaying a relatively impermeable sediment or bedrock.
   iii. Springs or groundwater seepage.

c. Areas that have shown movement during the Holocene epoch (from ten thousand years ago to the present) or that are underlain or covered by mass wastage debris of that epoch.

d. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and faults) in subsurface materials.

e. Slopes having a gradient steeper than 80 percent subject to rock fall during seismic shaking.

f. Areas potentially unstable because of rapid stream incision, stream bank erosion, and undercutting by wave action.

g. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding.

h. Any area with a slope of forty percent or steeper and with a vertical relief of ten or more feet except areas composed of consolidated rock. A slope delineated by establishing its toe and top and measured by averaging the inclination over at least ten feet of vertical relief."

We did not observe conditions meeting the above criteria at the site. In our opinion, the site conditions are not susceptible to landsliding and no landslide hazard exists.

3.4.3 Seismic Hazard Areas

Section 20.05.120.B.3 of the MCC defines defines seismic hazard areas as areas that are "...subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface failure."

The closest known Class A fault (existence of Quaternary fault of tectonic origin demonstrated by geologic evidence) to the project site is the southern Whidbey Island fault zone (SWIFZ). The SWIFZ is described as a northwest-trending (average strike N51°W), 5- to 7-kilometer wide fault zone that extends more than 65 kilometers from the Strait of Juan de Fuca southeast to Mukilteo on the eastern side of Possession Sound.

The subject site is located about 7.5 miles northeast of the north fault strand mapped by the USGS. We did not observe any indications of faulting or surface rupture at the project site and are unaware of any reported documentation of surface rupture due to past movement along the SWIFZ in the project area. Considering this, it is our opinion that the potential for ground rupture at the project site during a severe seismic event is negligible.

Based on the soil and groundwater conditions we observed in our subsurface explorations, it is our opinion that there is no risk for damage resulting from seismically induced slope failure, settlement, soil liquefaction, or lateral spreading. In our opinion, unusual seismic hazard areas do not exist at the site and design in accordance with local building codes for determining seismic forces would adequately mitigate impacts associated with ground shaking.

3.4.4 Other Geologically Hazardous Areas

In our opinion, the site is not susceptible to potential hazards resulting from geologically hazardous events described in Section 20.05.120.B.4 of the MCC that include tsunami, mass wasting, debris flows, rock falls, and differential settlement.

3.5 Seismic Design Parameters

Based on the site soil conditions and our knowledge of the area geology, per the 2015 International Building Code (IBC), site class "C" should be used in structural design. Based on this site class, in accordance with the IBC, the following parameters should be used in computing seismic forces:

Seismic Design Parameters (2015 IBC)

Spectral response acceleration (Short Period), S_{Ms}	1.185 g
Spectral response acceleration (1 – Second Period), S_{M1}	0.606 g
Five percent damped .2 second period, S_{Ds}	0.790 g
Five percent damped 1.0 second period, S_{D1}	0.404 g

The above values were determined for Latitude 47.874734°N and Longitude -121.977252°W using the USGS Ground Motion Parameter Calculator web site accessed November 29, 2018 at the web site http://earthquake.usgs.gov/designmaps/us/application.php.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

Based on our study, there are no geotechnical conditions that would preclude the planned development. The residences can be supported on conventional spread footings bearing on competent native soils underlying organic topsoil, or on structural fill placed on the competent native soils. Floor slabs and pavements can be similarly supported.

The site soils contain a sufficient amount of fines (silt- and clay-sized particles) such that they will be difficult to compact as structural fill when too wet or too dry. Accordingly, the ability to use the soils from site excavations as structural fill will depend on their moisture content and the prevailing weather conditions at the time of construction, and the ability of the contractor to properly moisture condition the soil. If grading activities will take place during the winter season, the owner should be prepared to import free-draining granular material for use as structural fill and backfill.

Undisturbed bearing surfaces composed of the native silt observed in Test Pits TP-6 and TP-7, or structural fill derived from the native silt, would typically provide suitable support for conventional spread footing foundations, floor slabs, and pavements; however, the soils will be easily disturbed by normal construction activity, particularly when wet. If disturbed, the soil will not be suitable for support, and the affected material would need to be removed with the foundations lowered to obtain support on an undisturbed soil subgrade. Alternatively, the soils can be removed, and grade restored with structural fill.

Based on our observations, it appears that a moderate perched groundwater condition exists beneath the site that may persist throughout much of the year. Considering this, it would be prudent for the contractor to anticipate the need for some initial construction drainage and soil moisture conditioning efforts to facilitate site grading.

Detailed recommendations regarding these issues and other geotechnical design considerations are provided in the following sections of this report. These recommendations should be incorporated into the final design drawings and construction specifications. Terra Associates, Inc. should review proposed building and grading plans for the project when available to verify that our geotechnical recommendations have been properly interpreted and incorporated into the project design, and to provide additional or alternate recommendations, if needed.

4.2 Site Preparation and Grading

To prepare the site for construction, all vegetation, organic surface soils, and other deleterious materials should be stripped and removed from the site. We expect surface stripping depths of about four to eight inches will generally be required to remove the organic surficial soils in the planned development areas; however, about two feet of dark brown organic silty sand was observed in Test Pit TP-7. Stripped vegetation debris should be removed from the site. Organic soils will not be suitable for use as structural fill, but may be used for limited depths in nonstructural areas or for landscaping purposes.

In the developed portions of the site, demolition of existing structures should include removal of existing foundations and abandonment of underground septic systems and other buried utilities. Abandoned utility pipes that fall outside of new building areas can be left in place provided they are sealed to prevent intrusion of groundwater seepage and soil.

Once clearing and grubbing operations are complete, cut and fill operations to establish desired building grades can be initiated. A representative of Terra Associates, Inc. should examine all bearing surfaces to verify that conditions encountered are as anticipated and are suitable for placement of structural fill or direct support of building and pavement elements. Our representative may request proofrolling exposed surfaces with a heavy rubber-tired vehicle to determine if any isolated soft and yielding areas are present. If unstable yielding areas are observed, they should be cut to firm bearing soil and filled to grade with structural fill. If the depth of excavation to remove unstable soils is excessive, use of geotextile fabric such as Mirafi 500X or equivalent in conjunction with structural fill can be considered in order to limit the depth of removal. In general, our experience has shown that a minimum of 18 inches of clean, granular structural fill over the geotextile fabric should establish a stable bearing surface.

We anticipate that most of the site soils will be suitable for use as structural fill provided they are properly moisture conditioned when placed. As discussed, the ability to use the native soils, particularly the observed silt soils, as structural fill will depend on the soil's moisture content when excavated, the prevailing weather conditions during site grading, and the ability of the contractor to properly moisture condition the soil. During the normally dry summer months, it may be possible to dry soils that are wet of optimum by aeration. As an alternative, stabilizing the moisture in the native soil with cement or lime can be considered. If soil amendment products are used, additional Temporary Erosion and Sedimentation Control (TESC) BMPs will need to be implemented to mitigate potential impacts to stormwater runoff associated with possible elevated pH levels. Moisture conditioning of soils that are dry of optimum would require the addition of water to the soils and thoroughly blending the material prior to compaction.

If grading activities are planned during the wet winter months, or if they extend into fall and winter, the owner should be prepared to import wet weather structural fill. For this purpose, we recommend importing a granular soil that meets the following grading requirements:

U.S. Sieve Size	Percent Passing
6 inches	100
No. 4	75 maximum
No. 200	5 maximum*

*Based on the 3/4-inch fraction.

Prior to use, Terra Associates, Inc. should examine and test all materials planned to be imported to the site for use as structural fill.

Structural fill should consist of properly moisture conditioned material that is placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-698 (Standard Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this ASTM standard. In our opinion, reducing the lift thickness to a maximum of six inches and using a sheep's-foot roller to compact the fill will improve the ability to achieve adequate compaction of the fine grained soils.

4.3 Slopes and Embankments

All permanent cut and fill slopes should be graded with a finished inclination of no greater than 2:1 (Horizontal:Vertical). Upon completion of grading, the slope face should be appropriately vegetated or provided with other physical means to guard against erosion. Final grades at the top of the slope must promote surface drainage away from the slope crest. Water must not be allowed to flow uncontrolled over the slope face. If surface runoff must be directed towards the top of a slope, it may be necessary to route collected water to an appropriate point of discharge beyond the toe in a closed system.

Embankment fills placed on slopes exceeding a grade of 20 percent must be keyed and benched into competent native soils. A generalized slope fill detail is shown on Figure 3. At a minimum, we recommend constructing a toe drain in the key trench for the fill embankment. The locations and extent of such toe drains will be best determined in the field at the time of construction. All fill placed for embankment construction should meet the structural fill requirements provided in Section 4.2 of this report.

4.4 Excavations

All excavations at the site associated with confined spaces, such as lower building level retaining walls, must be completed in accordance with local, state, and federal requirements. Based on the Washington State Safety and Health Administration (WSHA) regulations the medium dense to dense native soils would typically be classified as Type C soils. Very dense, cemented till and till-like soils would be classified as Type A soil.

Accordingly, for temporary excavations of more than 4 feet and less than 20 feet in depth, the side slopes in Type C soils should be laid back at a slope inclination of 1.5:1 (Horizontal:Vertical) or flatter. Side slopes in Type A soils can be laid back at a slope inclination of 0.75:1 or flatter. For temporary excavation slopes less than 8 feet in height in Type A soils, the lower 3.5 feet can be cut to a vertical condition, with a 0.75:1 slope graded above. For temporary excavation slopes greater than 8 feet in height up to a maximum height of 12 feet, the slope above the 3.5-foot vertical portion will need to be laid back at a minimum slope inclination of 1:1. No vertical cut with a backslope immediately above is allowed for excavation depths that exceed 12 feet. In this case, a four-foot vertical cut with an equivalent horizontal bench to the cut slope toe is required. If there is insufficient room to complete the excavations in this manner, or if excavations greater than 20 feet deep are planned, you may need to use temporary shoring to support the excavations.

Based on our field observations, seepage of perched groundwater should be anticipated within site excavations completed during the wet winter and spring months. In our opinion, the volume of water and rate of flow into site excavations should be relatively minor and would not be expected to impact the stability of the excavations when completed as described above. Conventional sump pumping procedures along with a system of collection trenches, if necessary, should be capable of maintaining a relatively dry excavation for construction purposes in these soils.

The above information is provided solely for the benefit of the owner and other design consultants, and should not be construed to imply that Terra Associates, Inc. assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

4.5 Foundations

The residential structures may be supported on conventional spread footing foundations bearing on competent native materials or on structural fill placed on a competent native material subgrade. Foundation subgrades should be prepared as recommended in Section 4.2 of this report. Perimeter foundations exposed to the weather should bear at a minimum depth of 1.5 feet below final exterior grades for frost protection. Interior foundations can be constructed at any convenient depth below the floor slab.

We recommend designing foundations bearing on competent soils for a net allowable bearing capacity of 2,500 pounds per square foot (psf). For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used in design. With the anticipated loads and this bearing stress applied, building settlements should be less than one-half inch total and one-fourth inch differential.

For designing foundations to resist lateral loads, a base friction coefficient of 0.35 can be used. Passive earth pressure acting on the sides of the footings may also be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 350 pounds per cubic foot (pcf). We recommend not including the upper 12 inches of soil in this computation because they can be affected by weather or disturbed by future grading activity. This value assumes the foundations will be constructed neat against competent native soil or the excavations are backfilled with structural fill, as described in Section 4.2 of this report. The recommended passive and friction values include a safety factor of 1.5.

4.6 Slab-on-Grade Floors

Slab-on-grade floors may be supported on a subgrade prepared as recommended in Section 4.2 of this report. Immediately below the floor slab, we recommend placing a four-inch thick capillary break layer composed of clean, coarse sand or fine gravel that has less than three percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting uniform curing of the slab and can actually serve as a water supply for moisture seeping through the slab and affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained.

4.7 Lateral Earth Pressures for Below-Grade Walls

The magnitude of earth pressures developing on below-grade walls will depend on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as described in Section 4.2 of this report. To prevent overstressing the walls during backfilling, heavy construction machinery should not be operated within five feet of the wall. Wall backfill in this zone should be compacted with hand-operated equipment. To prevent hydrostatic pressure development, wall drainage must also be installed. A typical wall drainage detail is shown on Figure 4.

With wall backfill placed and compacted as recommended, and drainage properly installed, we recommend designing unrestrained walls for an active earth pressure equivalent to a fluid weighing 35 pounds per cubic foot (pcf). For restrained walls, an additional uniform load of 100 psf should be added to the 35 pcf. To account for typical traffic surcharge loading, the walls can be designed for an additional imaginary height of two feet (two-foot soil surcharge). For evaluation of wall performance under seismic loading, a uniform pressure equivalent to 8H psf, where H is the height of the below-grade portion of the wall should be applied in addition to the static lateral earth pressure. These values assume a horizontal backfill condition and that no other surcharge loading, sloping embankments, or adjacent buildings will act on the wall. If such conditions exist, then the imposed loading must be included in the wall design. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 4.5 of this report.

Gravity block or mechanically stabilized earth (MSE) walls can also be used to accommodate vertical breaks in grade that may be required to achieve desired site elevations. We can design or provide soil design parameters for a design build approach for these alternative wall systems, if requested.

4.8 Infiltration Feasibility

Based on our study, it is our opinion that on-site infiltration is not a feasible alternative for management of site stormwater due to the presence of relatively-impermeable till and till-like soils at relatively shallow depths beneath the ground surface.

There may be opportunities to infiltrate limited amounts of site stormwater in the medium dense soils observed in the upper 2 to 2.5 feet of several of the test pits using Low Impact Development (LID) natural drainage practices (NDPs). The feasibility of using NDPs at the site should be based on field conditions observed at the time of site grading.

4.9 Stormwater Facilities

We understand that site stormwater will be routed to a detention vault or detention pond located in the southwestern portion of the planned development area. Conceptual design information is currently not available. Terra Associates, Inc. should review site development plans when available to verify that our recommendations are appropriate for the vault or pond design, and to provide additional or alternate recommendations, if necessary.

Detention Vault

If on-site detention will be provided by a buried vault, we expect that very dense, cemented till would be exposed throughout the bottom of the vault excavation. Vault foundations supported by these native soils may be designed for an allowable bearing capacity of 6,000 psf provided that the foundation subgrade is at least 8 feet below finished grade adjacent to the vault. For short-term loads, such as seismic, a one-third increase in this allowable capacity can be used. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 4.5.

The magnitude of earth pressures developing on the vault walls will depend in part on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as recommended in the Section 4.2 of this report. Lateral earth pressures recommended in Section 4.7 can be used in designing the below-grade vault walls. If it is not possible to discharge collected water at the footing elevation, we recommend setting the invert elevation of the wall drainpipe equivalent to the outfall invert and connecting the drain to the outfall pipe for discharge. For any portion of the wall that falls below the invert elevation of the wall drain, an earth pressure equivalent to a fluid weighing 85 pcf should be used. For evaluating walls under seismic loading, an additional uniform earth pressure equivalent to 8H psf, where H is the height of the below-grade wall in feet, can be used. These values assume a horizontal backfill condition. Where applicable, a uniform horizontal traffic surcharge value of 75 psf should be included in design of vault walls.

The vault may be subject to uplift pressures if drainage is not provided the full depth of the structure. The weight of the structure and the weight of the backfill soil above its foundation will provide resistance to uplift. A soil unit weight of 125 pcf can be used for the vault backfill provided the backfill is placed and compacted as structural fill as recommended above.

Detention Pond

We anticipate that pond construction would consist primarily of cuts into native soil. If fill berms will be constructed, the berm locations should be stripped of topsoil, duff, existing fill soils, and soils containing organic material prior to the placement of fill. The fill berms should be constructed by placing structural fill in layers no more than 12 inches thick, compacting each layer to a minimum of 95 percent relative compaction, as determined by ASTM Test Designation D-1557 (Modified Proctor). Material used to construct pond berms should consist predominately of granular soils with a maximum size of 3 inches and a minimum of 20 percent fines. The results of laboratory testing indicate that soils meeting this gradational requirement exist on-site. Terra Associates, Inc. should examine and test all on-site or imported materials proposed for use as berm fill prior to their use.

Because of exposure to fluctuating stored water levels, soils exposed on the interior pond slopes may be subject to some risk of periodic shallow instability or sloughing. Establishing interior slopes at a gradient of 3:1 (Horizontal:Vertical) will significantly reduce or eliminate this potential. Exterior berm slopes and interior slopes above the maximum water surface should be graded to a finished inclination no steeper than 2:1 (Horizontal:Vertical). Finished slope faces should be thoroughly compacted and vegetated to guard against erosion.

We expect that perched groundwater seepage will be intercepted by the detention pond excavation, particularly during the wet winter months. However, based on our field observations, we anticipate that the volume of groundwater that might find its way into the pond as seepage would likely be small with respect to the design volume capacity of the pond.

4.10 Drainage

Surface

Final exterior grades should promote free and positive drainage away from the building areas. We recommend providing a positive drainage gradient away from building perimeters. If a positive gradient cannot be provided, provisions for collection and disposal of surface water adjacent to the structure should be provided.

Surface water from developed areas must not be allowed to flow in an uncontrolled and concentrated manner over the crests of site slopes and embankments. Surface water should be directed away from the slope crests to a point of collection and controlled discharge. If site grades do not allow for directing surface water away from the slopes, then the water should be collected and tightlined to an approved point of controlled discharge.

Subsurface

We recommend installing a continuous drain along the outside lower edge of the perimeter building foundations. The drains can consist of four-inch diameter perforated PVC pipe that is enveloped in washed ½- to ¾-inch gravel-sized drainage aggregate that extends six inches above and to the sides of the pipe. The pipe can be laid to grade at an invert elevation equivalent to the bottom of footing grade.

The foundation drains and roof downspouts should be tightlined separately to an approved point of controlled discharge. All drains should be provided with cleanouts at easily accessible locations. These cleanouts should be serviced at least once each year.

4.11 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA) or local jurisdictional requirements. At minimum, trench backfill should be placed and compacted as structural fill as described in Section 4.2 of this report. As noted, the native soils are moisture sensitive and will require careful control of moisture to facilitate proper compaction. If utility construction takes place during the winter or if it is not feasible to properly moisture condition the excavated soil at the time of construction, it may be necessary to import suitable wet weather fill for utility trench backfilling.

4.12 Pavements

Pavements should be constructed on subgrades prepared as recommended in Section 4.2 of this report. Regardless of the degree of relative compaction achieved, the subgrade must be firm and relatively unyielding before paving. Proofrolling the subgrade with heavy construction equipment should be completed to verify this condition.

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. For traffic consisting mainly of light passenger vehicles with only occasional heavy traffic, and with a stable subgrade prepared as recommended, we recommend the following pavement sections:

- Two inches of hot mix asphalt (HMA) over four inches of crushed rock base (CRB)
- 3 ½ inches full depth HMA over prepared subgrade

The paving materials used should conform to the Washington State Department of Transportation (WSDOT) specifications for ½-inch class HMA and CRB.

Long-term pavement performance will depend on surface drainage. A poorly-drained pavement section will be subject to premature failure as a result of surface water infiltrating into the subgrade soils and reducing their supporting capability. For optimum pavement performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks when they occur.

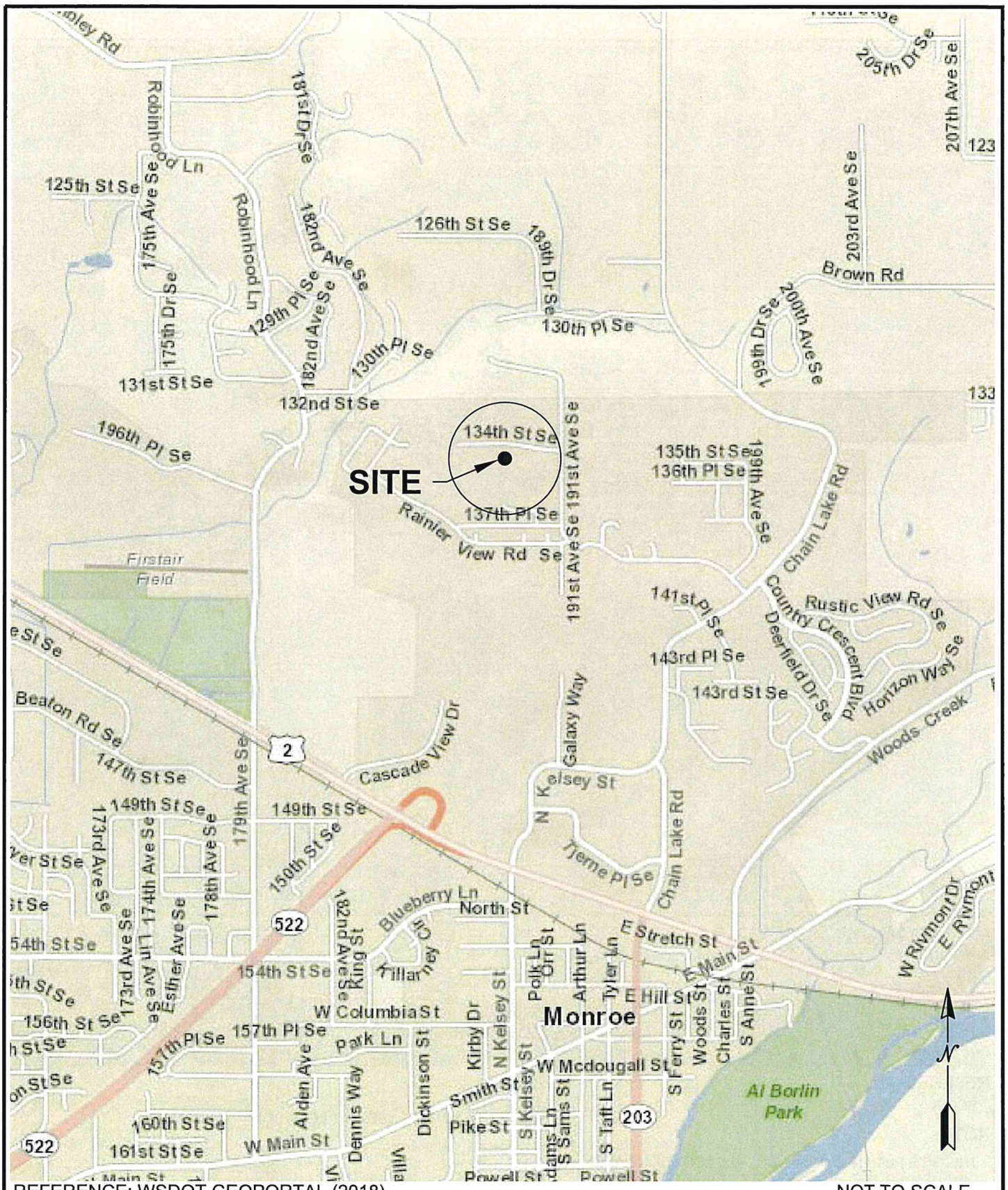
5.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review the final designs and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and implemented in project design. We should also provide geotechnical services during construction in order to observe compliance with our design concepts, specifications, and recommendations. This will allow for design changes if subsurface conditions differ from those anticipated prior to the start of construction.

6.0 LIMITATIONS

We prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. This report is the copyrighted property of Terra Associates, Inc. and is intended for specific application to the Barajas Property project in Monroe, Washington. This report is for the exclusive use of D.R. Horton and their authorized representatives. No other warranty, expressed or implied, is made.

The analyses and recommendations presented in this report are based on data obtained from the subsurface explorations completed at the site. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report, prior to proceeding with construction.



REFERENCE: WSDOT GEOPORTAL (2018)

NOT TO SCALE

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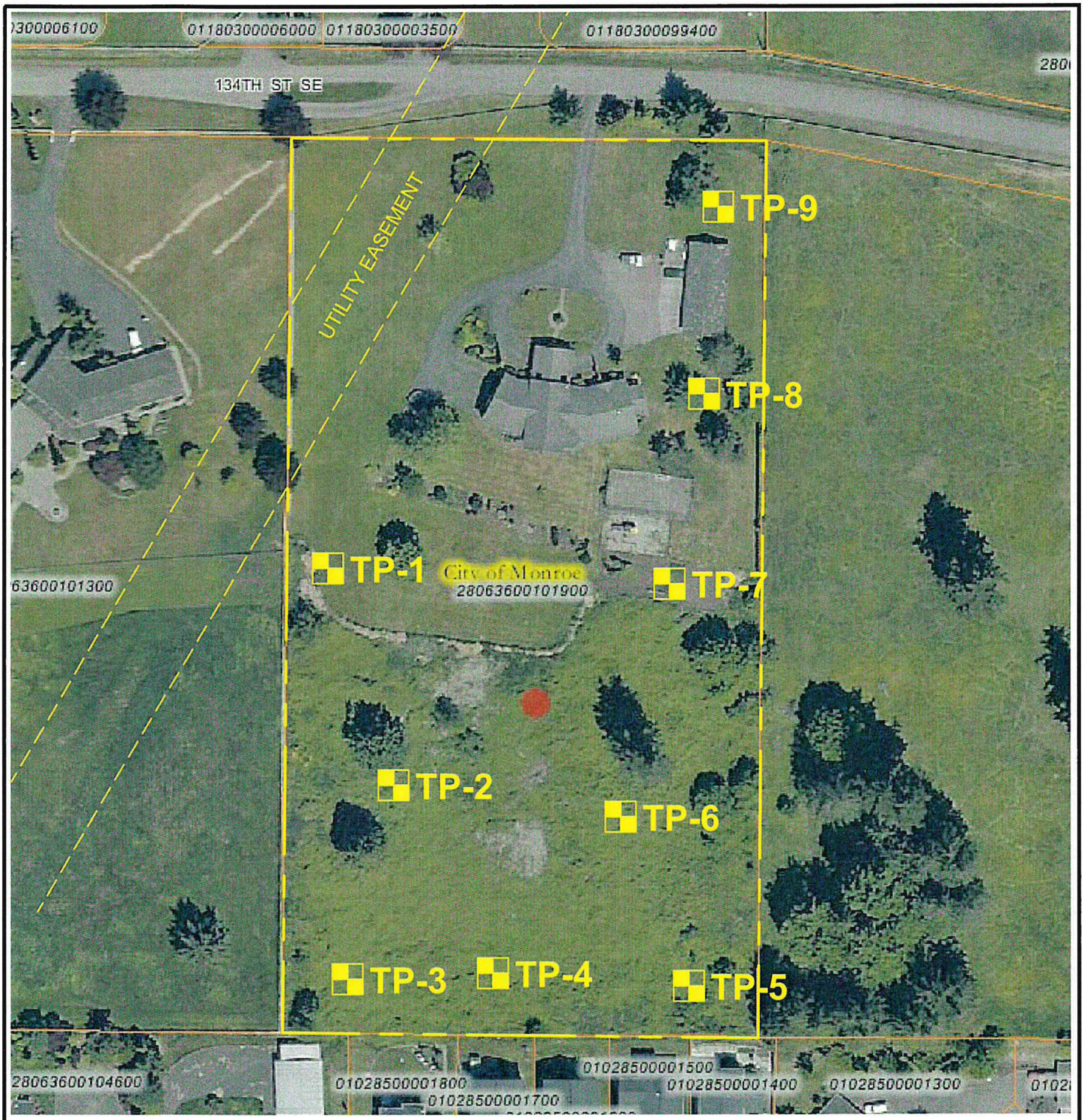
VICINITY MAP
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 1



REFERENCE:

SCOPI

NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

LEGEND:

APPROXIMATE TEST PIT LOCATION

0 100 200

APPROXIMATE SCALE IN FEET

N

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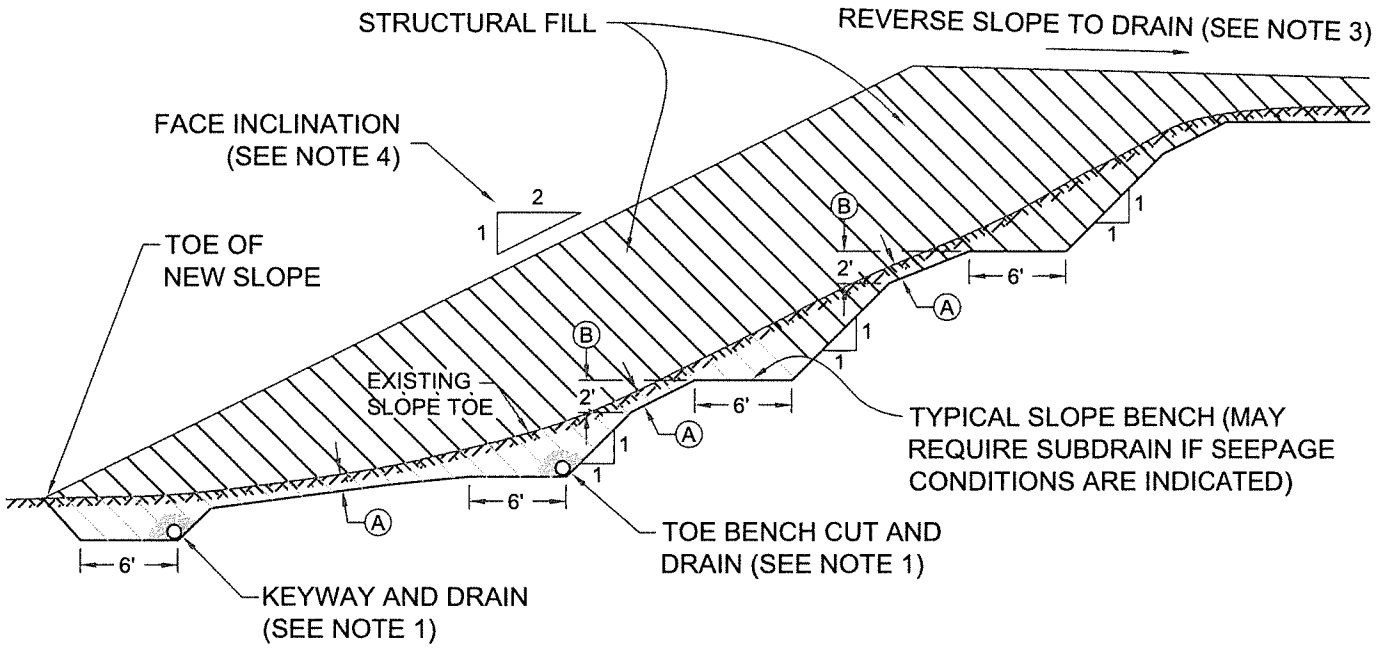
EXPLORATION LOCATION PLAN
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 2



NOT TO SCALE

NOTES:

1) DRAINS SHALL CONSIST OF 6" DIAMETER PERFORATED PVC PIPE ENVELOPED IN 1 cu. ft. OF WASHED 3/4" MINUS DRAINAGE GRAVEL.

2) (A) – TOPSOIL REMOVAL THICKNESS BETWEEN KEYWAY AND BENCHES.

   (B) – VERTICAL ELEVATION DIFFERENCE BETWEEN TOP OF LOWER BENCH BACKCUT AND UPPER BENCH ELEVATION.

3) RECOMMENDED PRIOR TO ESTABLISHMENT OF PERMANENT EROSION CONTROL MEASURES AND SITE DRAINAGE.

4) PERMANENT FACE INCLINATION TO BE ESTABLISHED AT 2:1 (H:V) OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER

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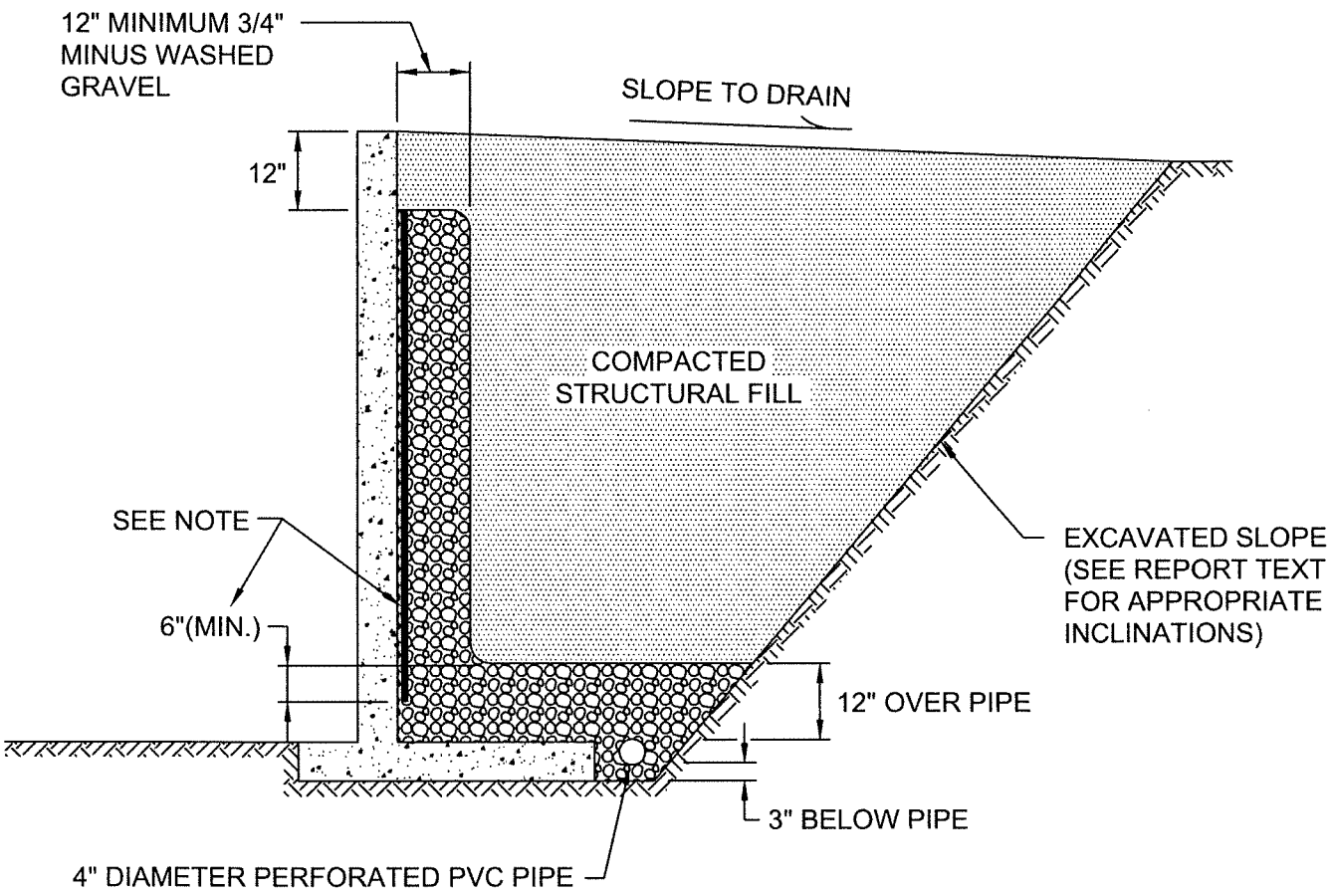
GENERALIZED SLOPE FILL DETAIL
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 3



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF 6 INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

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TYPICAL WALL DRAINAGE DETAIL
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 4

APPENDIX A

FIELD EXPLORATION AND LABORATORY TESTING

Barajas Property
Monroe, Washington

We explored subsurface conditions at the site in 9 test pits excavated to depths about 4.5 to 6.5 feet below ground surface using a track-mounted excavator. The test pit locations are shown on Figure 2. The test pit locations were approximately determined in the field by sighting and pacing relative to existing surface features. The Test Pit Logs are presented as Figures A-2 through A-10.

An engineering geologist from our office conducted the field reconnaissance and subsurface exploration, classified the observed soils, maintained a log of each test pit, obtained representative soil samples, and performed a visual reconnaissance of the site. All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS) described on Figure A-1.

Representative soil samples obtained from the test pits were placed in sealed containers and taken to our laboratory for further examination and testing. The moisture content of each sample was measured and is reported on the Test Pit Logs. Grain size analyses were performed on six soil samples. The test results are shown on Figures A-11 and A-12.

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS More than 50% material larger than No. 200 sieve size	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
			SP	Poorly-graded sands, sands with gravel, little or no fines.
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS More than 50% material smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity. (Lean clay)
			OL	Organic silts and organic clays of low plasticity.
	SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
			CH	Inorganic clays of high plasticity. (Fat clay)
			OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
II	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

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UNIFIED SOIL CLASSIFICATION SYSTEM
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure A-1

LOG OF TEST PIT NO. TP-1

FIGURE A-2

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Lawn **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 3 to 4 Feet **DEPTH TO CAVING:** 2 to 4 Feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(6 inches SOD and TOPSOIL) Red-brown silty SAND to sandy SILT, fine grained, trace of fine gravel, moist to wet, scattered cobbles. (SM/ML)	Medium Dense	49.1
2				
3 ▼				
4		Gray-brown SAND with silt and gravel, fine to medium sand, fine to coarse gravel, moist to wet, weakly to moderately cemented, scattered cobbles. (SP-SM)	Dense	
5				
6	2	Test pit terminated at 8 feet. Moderate groundwater seepage between about 3 and 4 feet. Minor caving between about 2 and 4 feet.		11.8
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-2

FIGURE A-3

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(6 inches DUFF and TOPSOIL) Red-brown silty SAND with gravel, fine sand, fine to coarse gravel, moist to wet, scattered cobbles. (SM)	Medium Dense	43.5
2 (▼)				
3		Gray-brown silty SAND, moist to wet, mottled. (SM)	Medium Dense to Dense	
4	2	Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, moderately to strongly cemented. (SM) (Till)	Dense to Very Dense	12.3
5				
	3			11.8
6		Test pit terminated at 5.5 feet. Light groundwater seepage at about 2 feet on north side of test pit.		
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-3

FIGURE A-4

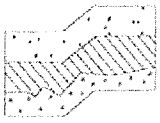
PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(6 inches DUFF and TOPSOIL) Red-brown silty SAND, fine grained, trace of fine gravel, moist to wet, scattered cobbles. (SM)	Medium Dense	6.9
2 ▼				
3		Gray-brown silty SAND, moist to wet, mottled. (SM)	Medium Dense to Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, moderately to strongly cemented, trace of cobbles. (SM) (Till)	Very Dense	
5				
6		Test pit terminated at 6 feet. Light groundwater seepage at about 2 feet.		
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. TP-4

FIGURE A-5

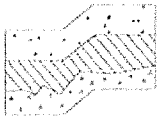
PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		(6 inches DUFF and TOPSOIL) Red-brown silty SAND with gravel, fine sand, fine to coarse gravel, moist to wet, scattered cobbles. (SM)	Medium Dense	
2				
3		Gray-brown silty SAND with gravel, fine to coarse sand, fine to coarse gravel, moist, mottled, moderately cemented, scattered cobbles. (SM) (Till-like)	Dense to Very Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
5				
6		Test pit terminated at 6 feet. No groundwater seepage.		
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. TP-5

FIGURE A-6

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 to 2.5 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		(6 inches DUFF and TOPSOIL) Dark brown organic silty SAND, fine to medium sand, trace of fine gravel, moist to wet, scattered cobbles. (OL/SM)	Loose to Medium Dense	
2		Brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet, mottled. (SM)	Medium Dense	
3		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, mottled, moderately cemented. (SM) (Till-like)	Dense to Very Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
5	1			7.9
6		Test pit terminated at 6 feet. Light groundwater seepage between about 2 and 2.5 feet.		
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-6

FIGURE A-7

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 to 2.5 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(8 inches DUFF and TOPSOIL) Brown SILT with sand and gravel to sandy SILT with gravel, fine sand, fine to coarse gravel, moist to wet. (ML)	Loose to Medium Dense	46.5
2 ▼				
3		Gray-brown SILT with sand to sandy SILT, fine sand, trace of fine to coarse gravel, moist, trace of cobbles, trace of 1.5-foot diameter boulders. (ML)	Medium Dense	
4		Gray-brown silty SAND with gravel, fine to coarse sand, fine to coarse gravel, moist, numerous cobbles, scattered boulders to 3 feet in diameter. (SM)	Dense	
5				
6		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
7		Boring terminated at 6.5 feet. Light to moderate groundwater seepage between 2 and 2.5 feet.		
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-7

FIGURE A-8

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 To 2.5 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Dark brown organic silty SAND, moist to wet. (OL/SM)	Medium Dense	
▼ 2	1	Brown sandy SILT, fine grained, wet. (ML)		52.2
3		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, mottled, moderately cemented, numerous cobbles. (SM) (Till-like)	Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
5	2	Test pit terminated at 5 feet. Light groundwater seepage between about 2 and 2.5 feet.		12.2
6				
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-8

FIGURE A-9

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		(4 inches SOD and TOPSOIL) Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist to wet. (SM)	Medium Dense	
2 ▼		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, scattered mottling, scattered cobbles. (SM)	Dense to Very Dense	
4	1	Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	12.7
5		Test pit terminated at 4 feet. Light groundwater seepage at about 2 feet.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Geology and
Environmental Earth Sciences

LOG OF TEST PIT NO. TP-9

FIGURE A-10

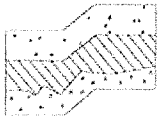
PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Lawn **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 0.3 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
	1	(4 inches SOD and TOPSOIL) Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, mottled, moderately cemented, numerous cobbles. (SM) (Till-like)	Dense	11.0
1				
2				
		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
3				
4				
		Test pit terminated at 4.5 feet. Light groundwater seepage at 0.3 feet on north side of test pit.		
5				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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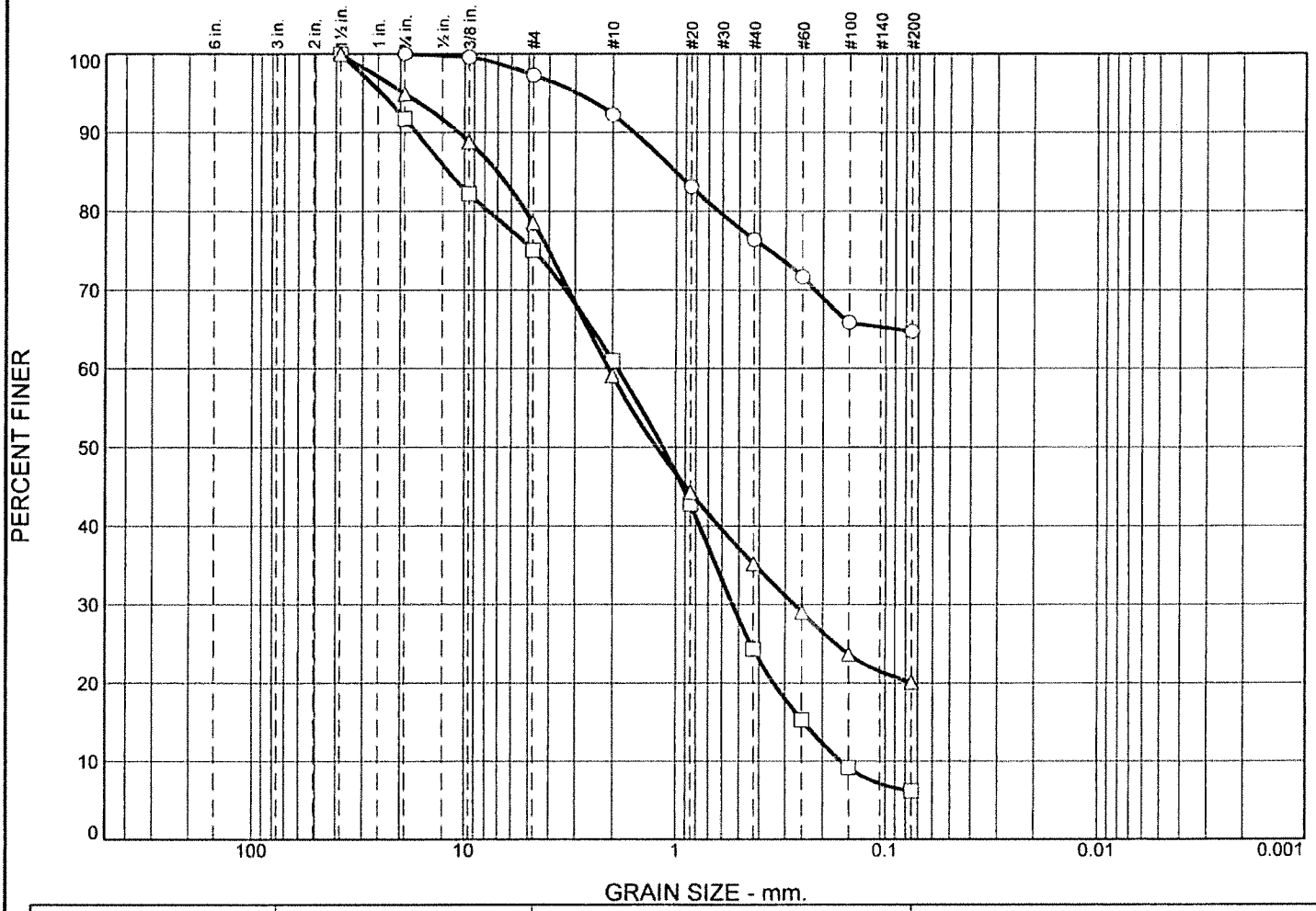
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.7	5.1	15.8	11.7	64.7	
□	0.0	8.3	16.7	14.0	36.7	18.1	6.2	
△	0.0	5.1	16.4	19.4	23.9	15.1	20.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.0083							
□			11.8597	1.8953	1.1483	0.5349	0.2447	0.1634	0.92	11.60
△			7.0146	2.0853	1.2313	0.2725				

Material Description	USCS	AASHTO
○ sandy SILT	ML	
□ SAND with silt and gravel	SP-SM	
△ silty SAND with gravel	SM	

Project No. T-8064 **Client:** D.R. Horton

Project: Barajas Property

○ **Location:** TP-1 **Depth:** 2.5'

□ **Location:** TP-1 **Depth:** 6'

△ **Location:** TP-3 **Depth:** 5'

Terra Associates, Inc.

Kirkland, WA

Remarks:

○ Tested November 13, 2018

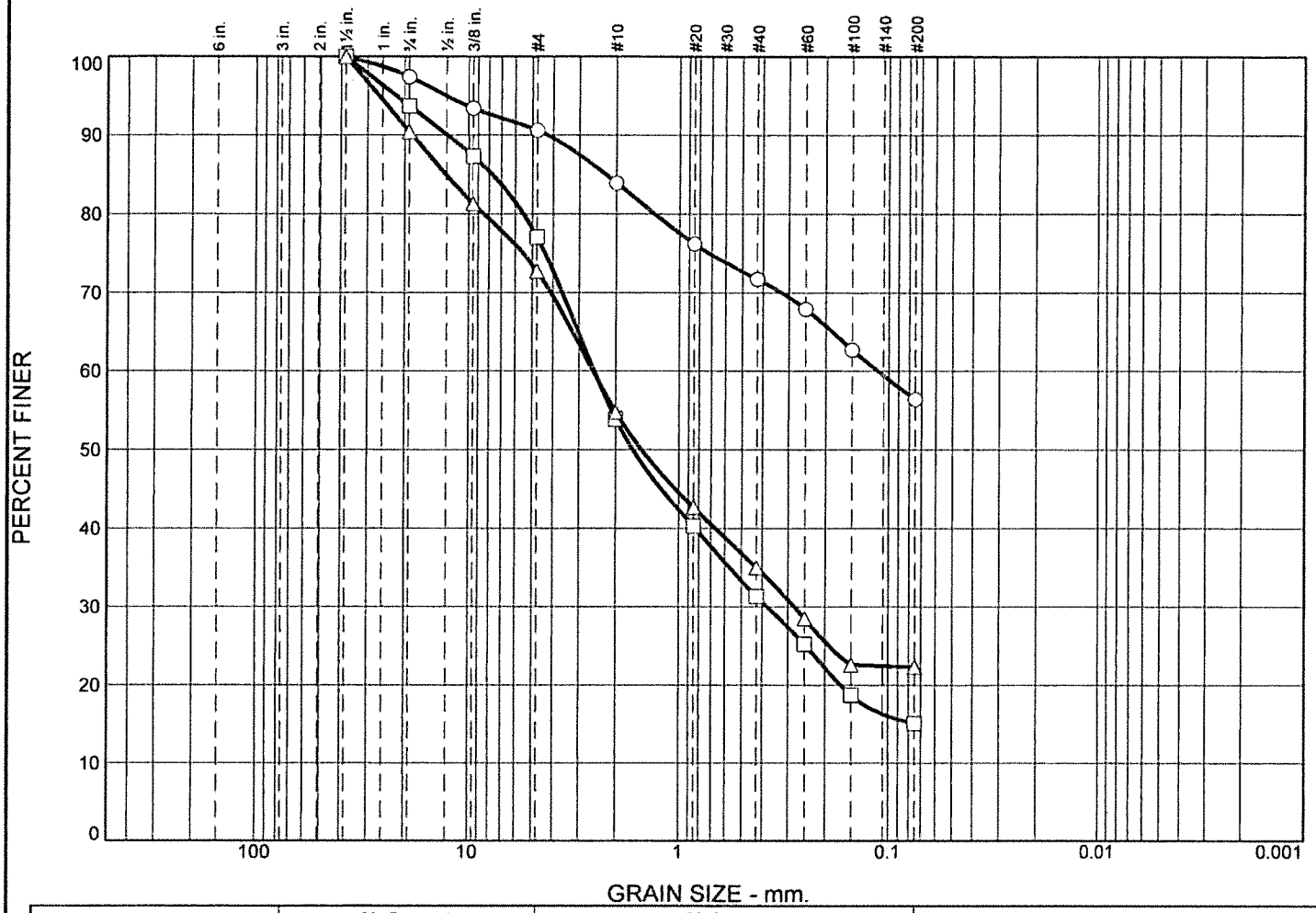
□ Tested November 13, 2018

△ Tested November 13, 2018

Figure A-11

Tested By: FQ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	2.6	6.8	6.7	12.2	15.3	56.4	
□	0.0	6.3	16.7	23.1	22.6	16.2	15.1	
△	0.0	9.6	17.7	17.9	19.8	12.7	22.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.2520	0.1133						
□			7.7327	2.5352	1.6581	0.3795				
△			12.8367	2.5702	1.5085	0.2806				

Material Description	USCS	AASHTO
○ sandy SILT	ML	
□ silty SAND with gravel	SM	
△ silty SAND with gravel	SM	

Project No. T-8064 **Client:** D.R. Horton

Project: Barajas Property

○ **Location:** TP-6 **Depth:** 2'

□ **Location:** TP-7 **Depth:** 5'

△ **Location:** TP-9 **Depth:** 1'

Remarks:

○ Tested November 13, 2018

□ Tested November 13, 2018

△ Tested November 13, 2018

Terra Associates, Inc.

Kirkland, WA

Figure A-12

Tested By: FQ

CP|H
CONSULTANTS

APPENDIX B

WWMH INPUT PARAMETERS AND RESULTS

	Impervious	
Basin	SF	Acre
Roads	21,386	0.49
Sidewalk	4,923	0.11
Lots	62,814	1.44
Driveway Drops	840	0.02
PATs	6,499	0.15
Tract A Path	385	0.01
Tract C Access Road	3,705	0.09
Pond Surface	17,997	0.41
Bypass	4,740	0.11

Property Area	206,848	4.75
Frontage Area	11,361	0.26
Total Site Area	218,209	5.01
Total Impervious	123,289	2.83
Total Pervious	94,920	2.18

Frontage	11361	0.26
Impervious	9626	0.22
Pervious	1735	0.04

Frontage Bypass Basin	4740	0.11
Impervioius	4207	0.10
Pervious	533	0.01

Area to Pond	305,844	7.02
Impervious	119,082	2.73
Pervious	186,762	4.29

Upstream Basin	SF	Acre
Pasture	92375	2.12
Total	92375	2.12

Lot #	Area (SF)	Imp. (SF)	Pervious (SF)
1	5,227	3,136	2,091
2	5,127	3,076	2,051
3	4,562	2,737	1,825
4	4,937	2,962	1,975
5	4,936	2,962	1,974
6	4,931	2,959	1,972
7	5,827	3,496	2,331
8	5,578	3,347	2,231
9	5,393	3,236	2,157
10	5,250	3,150	2,100
11	5,663	3,398	2,265
12	6,738	4,043	2,695
13	5,750	3,450	2,300
14	5,740	3,444	2,296
15	5,250	3,150	2,100
16	5,663	3,398	2,265
17	6,173	3,704	2,469
18	5,754	3,452	2,302
19	6,191	3,715	2,476
Total	104,690	62,814	41,876

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	190513_Pond SSD
Site Name:	Belmont Terrace PRD
Site Address:	
City:	Monroe, WA
Report Date:	5/13/2019
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.20
Version Date:	2016/02/25
Version:	4.2.12

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Predeveloped

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	5.01
Pervious Total	5.01
Impervious Land Use	acre
Impervious Total	0
Basin Total	5.01

Element Flows To:

Surface	Interflow	Groundwater

Upstream

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Flat	2.12
Pervious Total	2.12
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.12

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Developed to Pond

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	2.17
Pervious Total	2.17

Impervious Land Use	acre
ROADS FLAT	2.73
Impervious Total	2.73
Basin Total	4.9

Element Flows To:

Surface	Interflow	Groundwater
Detention Pond	Detention Pond	

Upstream Flow-through

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	2.12
Pervious Total	2.12

Impervious Land Use	acre
Impervious Total	0
Basin Total	2.12

Element Flows To:

Surface	Interflow	Groundwater
Detention Pond	Detention Pond	

Frontage Bypass

Bypass:	Yes
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.01
Pervious Total	0.01

Impervious Land Use	acre
ROADS FLAT	0.1
Impervious Total	0.1
Basin Total	0.11

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Detention Pond

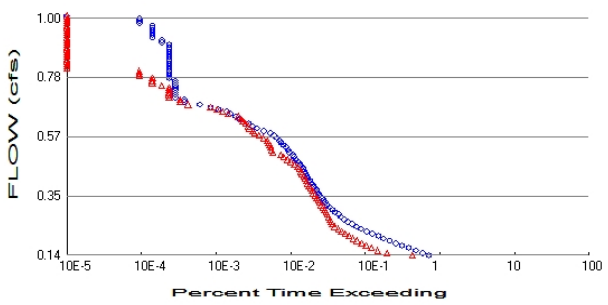
Depth: 9 ft.
Element Flows To:
Outlet 1 Outlet 2

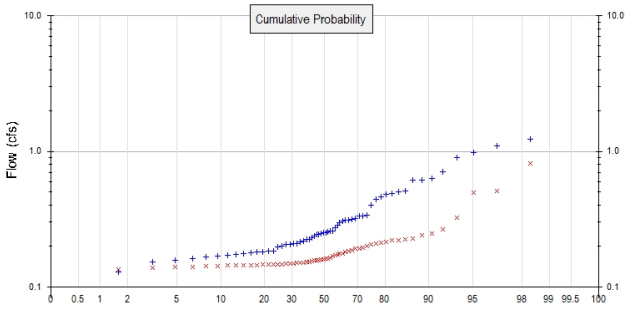
SSD Table Hydraulic Table

Stage (feet)	Area (ac.)	Volume (ac-ft.)	Outlet Struct	NotUsed	NotUsed	NotUsed	NotUsed
0.000	0.030	0.000	0.000	0.000	0.000	0.000	0.000
2.000	0.056	0.086	0.081	0.000	0.000	0.000	0.000
4.000	0.263	0.224	0.114	0.000	0.000	0.000	0.000
6.000	0.351	0.839	0.140	0.000	0.000	0.000	0.000
8.000	0.449	1.639	0.675	0.000	0.000	0.000	0.000
9.000	0.501	2.114	7.908	0.000	0.000	0.000	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 7.13
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 4.3
Total Impervious Area: 2.83

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.272234
5 year	0.445841
10 year	0.589641
25 year	0.807918
50 year	0.999549
100 year	1.2182

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.172779
5 year	0.23449
10 year	0.282537
25 year	0.352044
50 year	0.410664
100 year	0.475554

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.336	0.140
1950	0.319	0.172
1951	0.245	0.149
1952	0.210	0.150
1953	0.170	0.148
1954	0.978	0.185
1955	0.339	0.170
1956	0.284	0.239
1957	0.402	0.205
1958	0.502	0.221

1959	0.258	0.157
1960	0.255	0.160
1961	1.222	0.266
1962	0.257	0.162
1963	0.489	0.181
1964	0.311	0.144
1965	0.214	0.144
1966	0.129	0.134
1967	0.252	0.211
1968	0.310	0.175
1969	1.091	0.214
1970	0.179	0.141
1971	0.316	0.163
1972	0.205	0.195
1973	0.205	0.150
1974	0.508	0.185
1975	0.223	0.152
1976	0.199	0.159
1977	0.157	0.147
1978	0.181	0.146
1979	0.634	0.192
1980	0.272	0.146
1981	0.183	0.145
1982	0.253	0.163
1983	0.459	0.155
1984	0.246	0.226
1985	0.307	0.199
1986	0.704	0.495
1987	0.331	0.325
1988	0.169	0.146
1989	0.218	0.141
1990	0.230	0.156
1991	0.236	0.152
1992	0.182	0.150
1993	0.167	0.138
1994	0.172	0.157
1995	0.243	0.221
1996	0.444	0.209
1997	0.906	0.809
1998	0.153	0.169
1999	0.196	0.142
2000	0.162	0.224
2001	0.063	0.134
2002	0.226	0.144
2003	0.176	0.147
2004	0.297	0.247
2005	0.209	0.146
2006	0.611	0.192
2007	0.483	0.175
2008	0.610	0.511
2009	0.183	0.144

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.2219	0.8092
2	1.0908	0.5113
3	0.9784	0.4954

4	0.9056	0.3254
5	0.7040	0.2659
6	0.6336	0.2467
7	0.6108	0.2394
8	0.6098	0.2262
9	0.5082	0.2235
10	0.5017	0.2214
11	0.4887	0.2209
12	0.4833	0.2144
13	0.4587	0.2113
14	0.4442	0.2090
15	0.4021	0.2046
16	0.3390	0.1988
17	0.3355	0.1949
18	0.3309	0.1922
19	0.3189	0.1916
20	0.3156	0.1851
21	0.3112	0.1846
22	0.3098	0.1814
23	0.3074	0.1753
24	0.2975	0.1752
25	0.2838	0.1725
26	0.2720	0.1702
27	0.2583	0.1687
28	0.2574	0.1629
29	0.2545	0.1626
30	0.2525	0.1622
31	0.2523	0.1605
32	0.2461	0.1594
33	0.2453	0.1573
34	0.2426	0.1568
35	0.2362	0.1562
36	0.2298	0.1553
37	0.2255	0.1519
38	0.2232	0.1517
39	0.2181	0.1502
40	0.2145	0.1499
41	0.2099	0.1497
42	0.2088	0.1488
43	0.2051	0.1475
44	0.2050	0.1474
45	0.1986	0.1465
46	0.1961	0.1464
47	0.1829	0.1462
48	0.1826	0.1459
49	0.1819	0.1457
50	0.1805	0.1446
51	0.1787	0.1445
52	0.1761	0.1445
53	0.1724	0.1441
54	0.1702	0.1441
55	0.1688	0.1423
56	0.1667	0.1414
57	0.1625	0.1409
58	0.1574	0.1405
59	0.1529	0.1376
60	0.1290	0.1336
61	0.0631	0.1336

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1361	15169	9157	60	Pass
0.1448	12637	4188	33	Pass
0.1536	10117	3142	31	Pass
0.1623	8177	2562	31	Pass
0.1710	6637	2188	32	Pass
0.1797	5523	1903	34	Pass
0.1884	4534	1658	36	Pass
0.1972	3743	1469	39	Pass
0.2059	3198	1282	40	Pass
0.2146	2669	1149	43	Pass
0.2233	2244	1025	45	Pass
0.2321	1856	934	50	Pass
0.2408	1619	829	51	Pass
0.2495	1406	772	54	Pass
0.2582	1239	741	59	Pass
0.2669	1120	716	63	Pass
0.2757	1012	687	67	Pass
0.2844	929	661	71	Pass
0.2931	831	635	76	Pass
0.3018	776	610	78	Pass
0.3105	709	582	82	Pass
0.3193	655	544	83	Pass
0.3280	621	519	83	Pass
0.3367	588	501	85	Pass
0.3454	558	480	86	Pass
0.3542	524	452	86	Pass
0.3629	501	433	86	Pass
0.3716	480	415	86	Pass
0.3803	450	395	87	Pass
0.3890	430	375	87	Pass
0.3978	409	362	88	Pass
0.4065	388	347	89	Pass
0.4152	364	333	91	Pass
0.4239	350	321	91	Pass
0.4326	340	306	90	Pass
0.4414	328	291	88	Pass
0.4501	315	278	88	Pass
0.4588	297	262	88	Pass
0.4675	284	237	83	Pass
0.4763	271	214	78	Pass
0.4850	252	193	76	Pass
0.4937	238	172	72	Pass
0.5024	227	157	69	Pass
0.5111	206	123	59	Pass
0.5199	198	118	59	Pass
0.5286	186	115	61	Pass
0.5373	170	112	65	Pass
0.5460	158	107	67	Pass
0.5548	151	104	68	Pass
0.5635	142	92	64	Pass
0.5722	126	80	63	Pass
0.5809	113	70	61	Pass
0.5896	92	66	71	Pass

0.5984	76	60	78	Pass
0.6071	65	58	89	Pass
0.6158	58	53	91	Pass
0.6245	48	49	102	Pass
0.6332	44	46	104	Pass
0.6420	39	42	107	Pass
0.6507	33	31	93	Pass
0.6594	30	26	86	Pass
0.6681	23	22	95	Pass
0.6769	18	18	100	Pass
0.6856	13	9	69	Pass
0.6943	8	7	87	Pass
0.7030	8	7	87	Pass
0.7117	6	5	83	Pass
0.7205	6	5	83	Pass
0.7292	6	5	83	Pass
0.7379	6	5	83	Pass
0.7466	6	5	83	Pass
0.7553	6	4	66	Pass
0.7641	6	3	50	Pass
0.7728	6	3	50	Pass
0.7815	5	3	60	Pass
0.7902	5	2	40	Pass
0.7990	5	2	40	Pass
0.8077	5	2	40	Pass
0.8164	5	0	0	Pass
0.8251	5	0	0	Pass
0.8338	5	0	0	Pass
0.8426	5	0	0	Pass
0.8513	5	0	0	Pass
0.8600	5	0	0	Pass
0.8687	5	0	0	Pass
0.8774	5	0	0	Pass
0.8862	5	0	0	Pass
0.8949	5	0	0	Pass
0.9036	5	0	0	Pass
0.9123	4	0	0	Pass
0.9211	4	0	0	Pass
0.9298	3	0	0	Pass
0.9385	3	0	0	Pass
0.9472	3	0	0	Pass
0.9559	3	0	0	Pass
0.9647	3	0	0	Pass
0.9734	3	0	0	Pass
0.9821	2	0	0	Pass
0.9908	2	0	0	Pass
0.9995	2	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.4555 acre-feet
On-line facility target flow:	0.5004 cfs.
Adjusted for 15 min:	0.5004 cfs.
Off-line facility target flow:	0.2809 cfs.
Adjusted for 15 min:	0.2809 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Detention Pond POC	☐	839.83			☐	0.00			
Total Volume Infiltrated		839.83	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

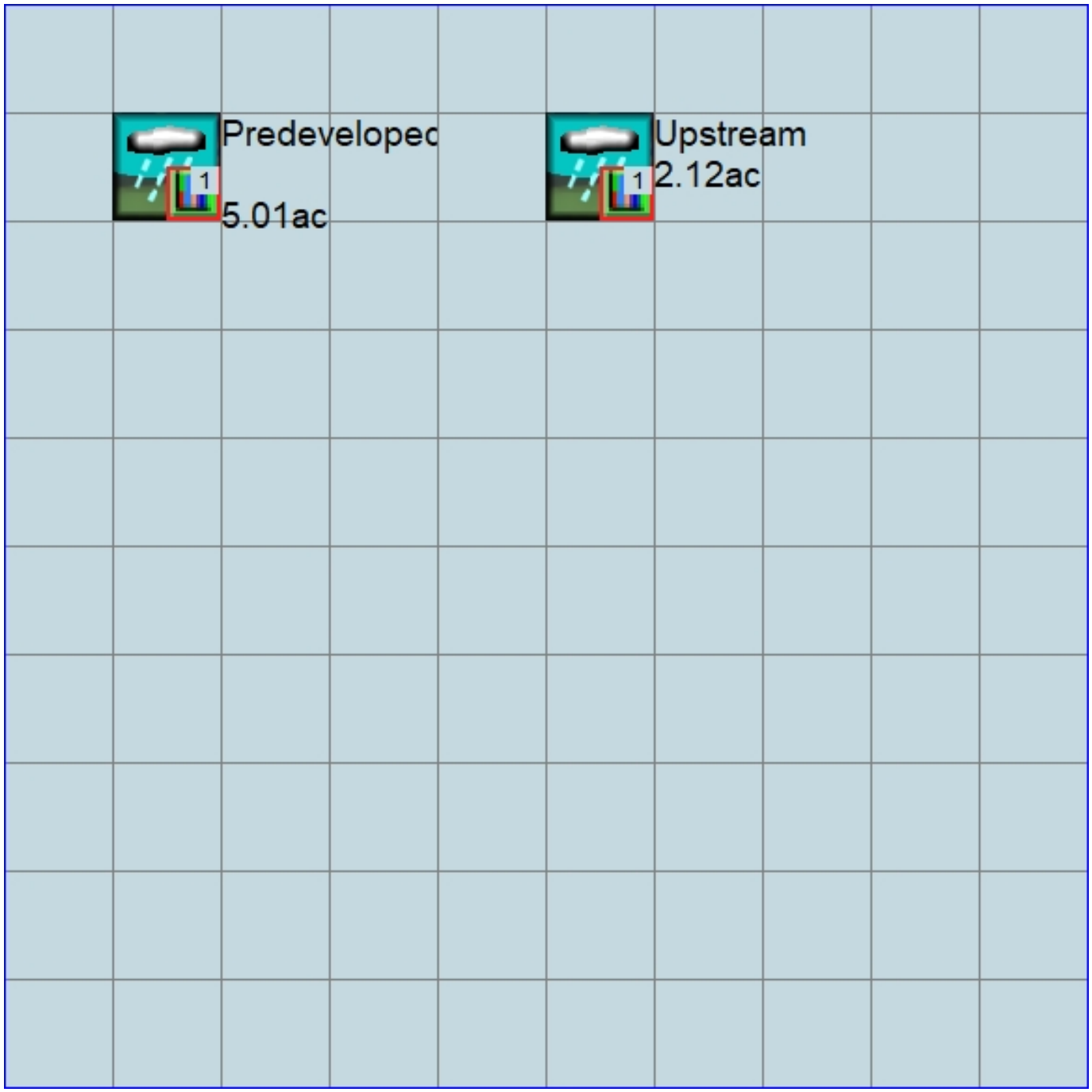
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   190513_Pond SSD.wdm
MESSU       25   Pre190513_Pond SSD.MES
            27   Pre190513_Pond SSD.L61
            28   Pre190513_Pond SSD.L62
            30   POC190513_Pond SSD1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      PERLND      13
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Predeveloped                MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
   13     C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
   13         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
```

```
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
   13         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
   13              0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10              0         0         2         2         0         0         0
   13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10            0.2       0.5      0.35         6       0.5       0.7
   13           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10              0         0         0         0       2.5         1         0
   13              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                 in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
```

```
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Predeveloped***
PERLND  10                        5.01     COPY   501     12
PERLND  10                        5.01     COPY   501     13
Upstream***
PERLND  13                        2.12     COPY   501     12
PERLND  13                        2.12     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                      in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                 ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------->      ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                    ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
```

```
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   190513_Pond SSD.wdm
MESSU       25   Mit190513_Pond SSD.MES
            27   Mit190513_Pond SSD.L61
            28   Mit190513_Pond SSD.L62
            30   POC190513_Pond SSD1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      16
      IMPLND       1
      PERLND      13
      RCHRES       1
      COPY         1
      COPY       501
      COPY       601
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Detention Pond              MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  601         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out            ***
   16     C, Lawn, Flat           1    1    1    1   27    0
   13     C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   16         0    0    1    0    0    0    0    0    0    0    0    0
   13         0    0    1    0    0    0    0    0    0    0    0    0
```

```
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
   13         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16              0       4.5      0.03       400      0.05       0.5     0.996
   13              0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
   13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16            0.1      0.25      0.25         6       0.5      0.25
   13           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   16              0         0         0         0       2.5         1         0
   13              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
```

```
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Developed to Pond***
PERLND  16                       2.17     RCHRES   1      2
PERLND  16                       2.17     RCHRES   1      3
IMPLND   1                       2.73     RCHRES   1      5
Upstream Flow-through***
PERLND  13                       2.12     RCHRES   1      2
PERLND  13                       2.12     RCHRES   1      3
Frontage Bypass***
PERLND  16                       0.01     COPY   501     12
PERLND  16                       0.01     COPY   601     12
PERLND  16                       0.01     COPY   501     13
PERLND  16                       0.01     COPY   601     13
IMPLND   1                        0.1     COPY   501     15
IMPLND   1                        0.1     COPY   601     15

******Routing******
PERLND  16                       2.17     COPY     1     12
IMPLND   1                       2.73     COPY     1     15
PERLND  16                       2.17     COPY     1     13
PERLND  13                       2.12     COPY     1     12
PERLND  13                       2.12     COPY     1     13
RCHRES   1                          1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Detention Pond          1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***
```

```
  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                        ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *        *  *  *  *  *        ***
    1        0  1  0  0    4  0  0  0  0        0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                           ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1          0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
    6    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.030000  0.000000  0.000000
  2.000000  0.056000  0.086000  0.080688
  4.000000  0.263000  0.224000  0.114110
  6.000000  0.351000  0.839000  0.139756
  8.000000  0.449000  1.639000  0.674672
  9.000000  0.501000  2.114000  7.908392
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL      REPL
END EXT TARGETS
```

```
MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK         2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     2

  MASS-LINK         3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     3

  MASS-LINK         5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     5

  MASS-LINK        12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    12

  MASS-LINK        13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    13

  MASS-LINK        15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    15

  MASS-LINK        16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK    16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

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CONSULTANTS

APPENDIX C

CONVEYANCE CALCULATIONS

APPENDIX C - CPH Rational Calculations

Project Name: Belmont Terrace PRD
CPH Project No.: 0035-18-027

	10 yr	25 yr	100yr
a_R	2.44	2.66	2.61
b_R	0.64	0.65	0.63
P_R	2.8	3.2	3.8

(NOAA Atlas - Isopluvial Maps: Figures 27,28,30)

Description: Rational calculation spreadsheet for backwater analysis

Basin / Subbasin	Total Area		C1	A1 (acres)	C2	A2 (acres)	Cc	Flowpath Slope (ft/ft)	k_R (KCSWDM Table 3.2.1.C)	Velocity (fps)	Length of Flowpath (feet)	Travel Time (minutes)	Travel Time Used (minutes)	i_R	I_R	A_T (acres)	Q Basin (cfs)	Q_T Total (cfs)	Length of Pipe (feet)	Diameter of Pipe (inches)	Slope of Pipe (ft/ft)	Manning's Value "n"	Velocity Full (fps)	Q_f Full (cfs)	Q_f/Q_T	Q Ratio	To CB
	SF	AC																									
CB100	21457	0.49	0.90	0.30	0.25	0.19	0.65	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.49	0.99	7.44	CPH Backwater Spreadsheet								
CB105	21667	0.50	0.90	0.33	0.25	0.17	0.68	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.50	1.05	6.45	CPH Backwater Spreadsheet								
CB110	25287	0.58	0.90	0.42	0.25	0.16	0.72	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.58	1.30	5.40	CPH Backwater Spreadsheet								
CB115	32738	0.75	0.90	0.14	0.25	0.61	0.37	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.75	0.87	3.37	CPH Backwater Spreadsheet								
CB120	2354	0.05	0.90	0.04	0.25	0.01	0.73	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.05	0.12	1.33	CPH Backwater Spreadsheet								
CB125	19811	0.45	0.90	0.26	0.25	0.19	0.62	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.45	0.88	1.21	CPH Backwater Spreadsheet								
CB130	1484	0.03	0.90	0.02	0.25	0.01	0.63	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.03	0.07	0.33	CPH Backwater Spreadsheet								
CB135	4657	0.11	0.90	0.09	0.25	0.02	0.80	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.11	0.27	0.27	CPH Backwater Spreadsheet								
CB111	15896	0.36	0.90	0.22	0.25	0.14	0.64	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.36	0.73	0.73	CPH Backwater Spreadsheet								
CB116	23324	0.54	0.90	0.37	0.25	0.17	0.70	0.02	17.00	2.08	50.00	0.40	6.30	0.82	3.11	0.54	1.16	1.16	CPH Backwater Spreadsheet								

PROJECT: Belmont Terrace PRD
DATE: 5/14/2019 DESCRIPTION: Storm drain conveyance system for Belmont Terrace PRD: Backwater Spreadsheet.
CPH PROJECT No. 0035-18-027

		1	2	3	4	5	6		7	8	9	10			11	12		13	14	15				16	17		18			19	20		
PIPE SEGMENT		Design Flow Q	Length	Pipe Size	Manning's n	Downstream Invert Elevation	Upstream Inlet Elevation	Pipe Slope	Barrel Area	Barrel Velocity	Barrel Velocity Head	TW Elevation	Barrel Perimeter	Friction Slope	Friction Loss	Entrance HGL Elevation	Entrance Loss Coefficient	Entrance Head Loss	Exit Head Loss	Outlet Control Elevation	d_c/D	Critical Depth	Critical Velocity	Inlet Control Elevation	Approach Velocity Head	K_b	Bend Head Loss	Q_3/Q_1	K_j	Junction Head Loss	Head Water	Rim Elevation	Overflow?
D/S CB	**U/S CB**	(cfs)	(ft)	(in)		(ft)	(ft)	(ft/ft)	(sq. ft)	(fps)	(ft)	(ft)	(ft)	S_f	(ft)	(ft)	k_e	(ft)	(ft)	(ft)		(ft)	(fps)	(ft)	(ft)		(ft)	(%)		(ft)	(ft)	(ft)	
Pond	CB100	7.44	35	18	0.012	311.00	322.32	0.323	1.77	4.21	0.28	316.00	4.71	0.00	0.15	323.82	0.50	0.14	0.28	324.23	0.57	0.86	5.25	323.23	0.24	0.00	0.000	0%	0.00	0.00	323.99	328.78	Contained
CB100	CB105	6.45	153.9	18	0.012	322.32	323.64	0.009	1.77	3.65	0.24	323.99	4.71	0.00	0.49	325.14	0.50	0.12	0.24	325.50	0.57	0.86	5.25	324.67	0.75	0.00	0.000	0%	0.00	0.00	324.75	340.69	Contained
CB105	CB110	5.40	140.5	12	0.012	323.64	334.69	0.079	0.79	6.88	0.75	324.75	3.14	0.02	2.72	335.69	0.50	0.37	0.75	336.81	0.57	0.57	4.28	337.80	0.32	0.00	0.000	0%	0.00	0.00	337.49	346.79	Contained
CB110	CB115	3.37	109.8	12	0.012	334.69	343.56	0.081	0.79	4.29	0.29	337.49	3.14	0.01	0.83	344.56	0.50	0.14	0.29	344.99	0.57	0.57	4.28	345.08	0.06	0.00	0.000	0%	0.00	0.00	345.02	359.57	Contained
CB115	CB120	1.33	128	12	0.012	343.56	356.36	0.100	0.79	1.69	0.04	345.02	3.14	0.00	0.15	357.36	0.50	0.02	0.04	357.43	0.57	0.57	4.28	357.24	0.04	0.00	0.000	0%	0.00	0.00	357.39	359.57	Contained
CB120	CB125	1.21	34.5	12	0.012	356.36	356.57	0.006	0.79	1.54	0.04	357.39	3.14	0.00	0.03	357.57	0.50	0.02	0.04	357.63	0.57	0.57	4.28	357.49	0.00	0.00	0.000	0%	0.00	0.00	357.62	368.40	Contained
CB125	CB130	0.33	92.9	12	0.012	356.57	365.40	0.095	0.79	0.42	0.00	357.62	3.14	0.00	0.01	366.40	0.50	0.00	0.00	366.40	0.57	0.57	4.28	366.22	0.00	0.00	0.000	0%	0.00	0.00	366.40	371.62	Contained
CB130	CB135	0.27	37.8	12	0.012	365.40	368.62	0.085	0.79	0.34	0.00	366.40	3.14	0.00	0.00	369.62	0.50	0.00	0.00	369.62	0.57	0.57	4.28	369.44	0.01	0.00	0.000	0%	0.00	0.00	369.61	371.62	Contained
CB110	CB111	0.73	74.6	12	0.012	334.69	340.00	0.071	0.79	0.93	0.01	324.75	3.14	0.00	0.03	341.00	0.50	0.01	0.01	341.02	0.57	0.57	4.28	340.85	0.00	0.00	0.000	0%	0.00	0.00	341.02	343.14	Contained
CB115	CB116	1.16	34.5	12	0.012	343.56	343.77	0.006	0.79	1.48	0.03	337.49	3.14	0.00	0.03	344.77	0.50	0.02	0.03	344.82	0.57	0.57	4.28	344.68	0.00	0.00	0.000	0%	0.00	0.00	344.82	346.77	Contained

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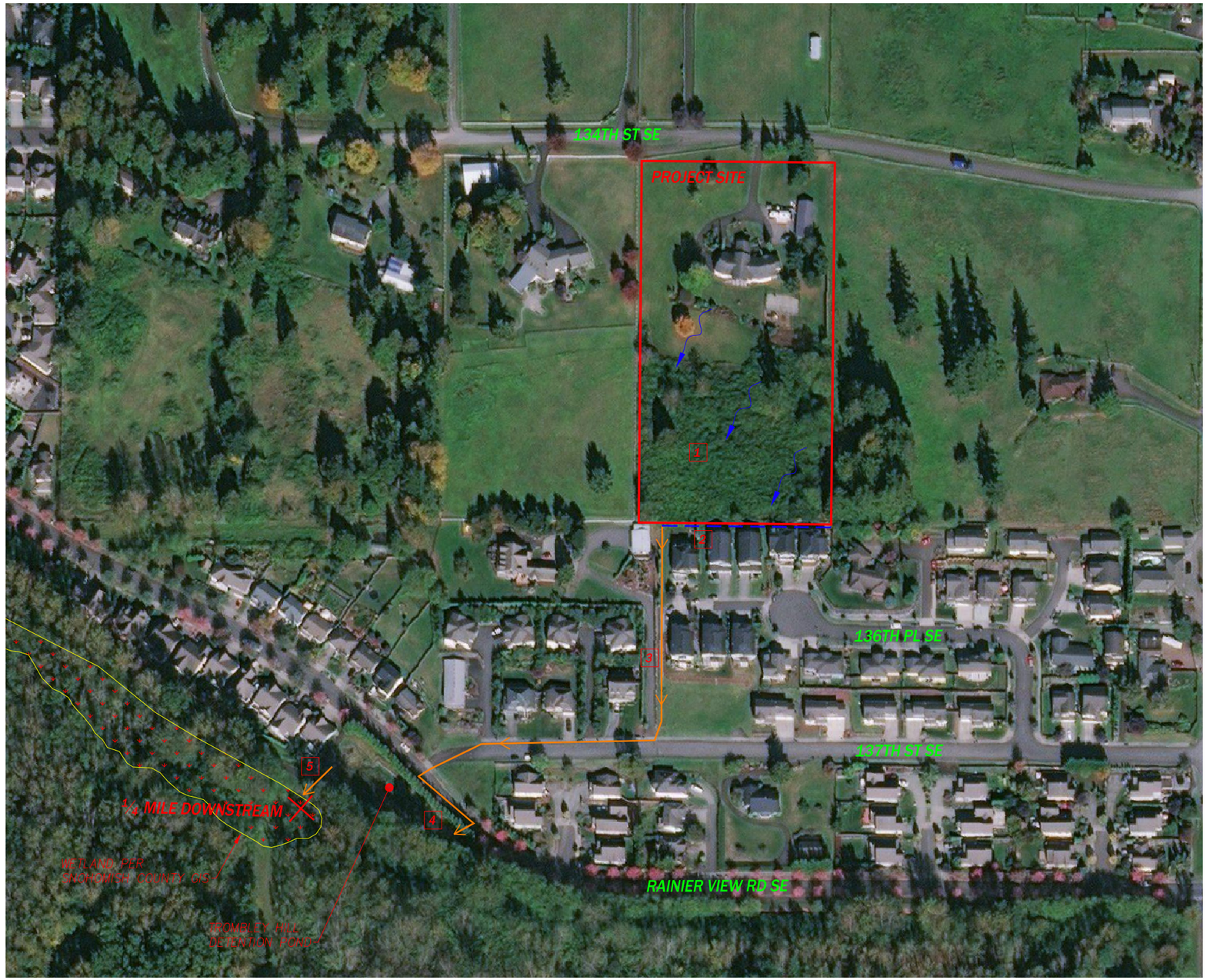
APPENDIX D

DOWNSTREAM ANALYSIS

Downstream Analysis Drainage System Table

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance from site discharge	Existing Problems	Potential Problems	Observations of field inspector, resource reviewer, or resident
see map	Type: sheet flow, swale, stream, channel, pipe, pond; Size: diameter, surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	¼ ml = 1,320 ft.	constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts
1	Sheet Flow	Runoff flows southwesterly across site	~10%	0’	None observed		See photos #1, #2, #5, #6
2	Interceptor Trench with perforated pipe	Sheet flow enters gravel interceptor trench along north property boundary of Toivo Ridge development and flows west to an existing catch basin	~6%	5’	None observed		See downstream map
3	Catch basins and conveyance pipes	Runoff flows through a series of catch basins and underground pipes	~12%	5’ - 955’	None observed		See downstream map
4	Detention Pond	Runoff discharges into Trombley Hill detention pond	0%	955’ – 1200’	None observed		See photo #9
5	Control Structure and conveyance pipes	Runoff discharges from pond and ultimately outfalls to a wetland southwest of pond	~4%	1200’ – 1320’	None observed		See downstream map



LEGEND

- PROPERTY BOUNDARY
- SHEET FLOW
- UNDERGROUND CONVEYANCE SYSTEM
- GRAVEL INTERCEPTOR TRENCH

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Site Planning • Civil Engineering
Land Use Consulting • Project Management
11431 Willows Rd. NE, Suite 120
Redmond, WA 98052
Phone: (425) 285-2390 | FAX: (425) 285-2389
www.cphconsultants.com

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PLAN IN FEET

DOWNSTREAM MAP

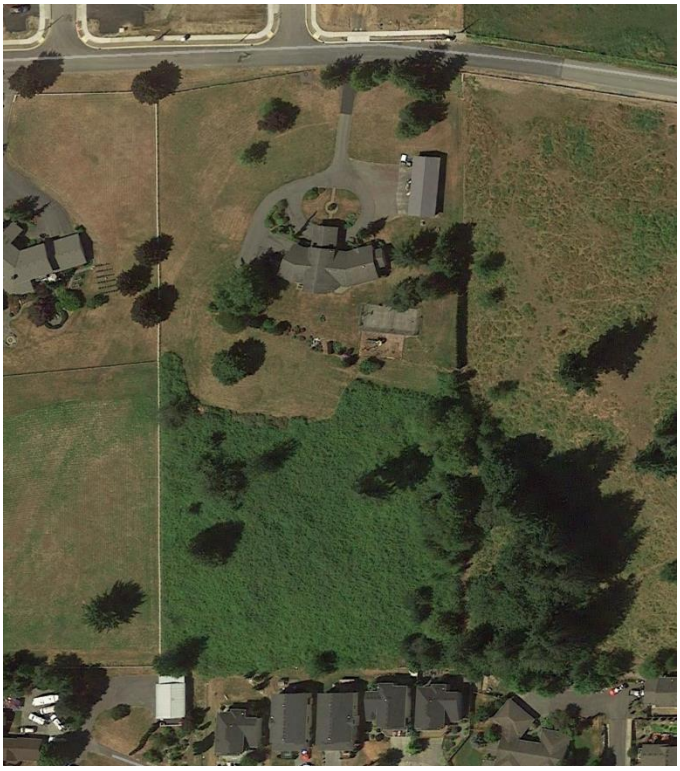

Photo #1: Aerial imagery of project site.

Photo #2: Looking south at project site from 134th St SE at approximately midpoint of northern property boundary.

Photo #3: Looking west at 134th St SE along northern property boundary of project site.

Photo #4: Looking east at 134th St SE along northern property boundary of project site.

Photo #5: Looking south along eastern property boundary of project site.

Photo #6: Looking south along western property boundary of project site.

Photo #7: Looking north towards southern property boundary of project site. Buried stormwater pipes between existing house and fence convey flows to Trombley Hill detention pond.

Photo #8: Looking south from same location as photo #7. Buried stormwater pipes between existing house and fence convey flows to Trombley Hill detention pond.

Photo #9: Looking west at Trombley Hill detention pond.

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APPENDIX E

OPERATIONS AND MAINTENANCE MANUAL

V-4.6 Maintenance Standards for Drainage Facilities

The facility-specific maintenance standards contained in this section are intended to be conditions for determining if maintenance actions are required as identified through inspection. They are not intended to be measures of the facility's required condition at all times between inspections. In other words, exceedence of these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance schedules shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

Table V-4.5.2(1) Maintenance Standards - Detention Ponds

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	Any trash and debris which exceed 1 cubic feet per 1,000 square feet. In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site
	Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or local regulations. (Apply requirements of adopted IPM policies for the use of herbicides).	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with local health department) Complete eradication of noxious weeds may not be possible. Compliance with State or local eradication policies required
	Contaminants	Any evidence of oil,	No contaminants or pol-

Table V-4.5.2(1) Maintenance Standards - Detention Ponds (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
	and Pollution	gasoline, contaminants or other pollutants (Coordinate removal/cleanup with local water quality response agency).	lutants present.
	Rodent Holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordinate with local health department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)
	Beaver Dams	Dam results in change or function of the facility.	Facility is returned to design function. (Coordinate trapping of beavers and removal of dams with appropriate permitting agencies)
	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted IPM policies
	Tree Growth and Hazard Trees	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access or maintenance, do not remove	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood). Remove hazard Trees

Table V-4.5.2(1) Maintenance Standards - Detention Ponds (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
		If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements)	
Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure (s); e.g.,rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
Storage Area	Sediment	Accumulated sediment that exceeds 10% of the designed pond depth unless otherwise specified or affects inletting or outletting condition of the facility.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
	Liner (if Applicable)	Liner is visible and has more than three 1/4-inch holes in it.	Liner repaired or replaced. Liner is fully covered.
Ponds Berms (Dikes)	Settlements	Any part of berm which has settled 4 inches lower than the design elevation If settlement is apparent, measure berm to determine amount of settlement	Dike is built back to the design elevation.

Table V-4.5.2(1) Maintenance Standards - Detention Ponds (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
		Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.	
	Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Goethechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
Emergency Overflow/ Spillway and Berms over 4 feet in height	Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping. Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
	Piping	Discernable water flow through pond berm. Ongoing erosion with	Piping eliminated. Erosion potential resolved.

Table V-4.5.2(1) Maintenance Standards - Detention Ponds (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
		potential for erosion to continue. (Recommend a Goethechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	
Emergency Overflow/Spillway	Emergency Overflow/Spillway	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway. (Rip-rap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
	Erosion	See "Side Slopes of Pond"	

Table V-4.5.2(2) Maintenance Standards - Infiltration

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Poisonous/Noxious Vegetation	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Contaminants and Pollution	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Rodent Holes	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1)
Storage Area	Sediment	Water ponding in infiltration pond after rainfall ceases and appropriate	Sediment is removed

Table V-4.5.2(3) Maintenance Standards - Closed Detention Systems (Tanks/Vaults) (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Catch Basins	See "Catch Basins" (No. 5)	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(4) Maintenance Standards - Control Structure/Flow Restrictor

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris (Includes Sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall. Structure is not in upright position (allow up to 10% from plumb). Connections to outlet pipe	Structure securely attached to wall and outlet pipe. Structure in correct position. Connections to outlet pipe are water tight; structure repaired or replaced and works as

Table V-4.5.2(4) Maintenance Standards - Control Structure/Flow Restrictor (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
		are not watertight and show signs of rust. Any holes - other than designed holes - in the structure.	designed. Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing. Gate cannot be moved up and down by one maintenance person. Chain/rod leading to gate is missing or damaged. Gate is rusted over 50% of its surface area.	Gate is watertight and works as designed. Gate moves up and down easily and is watertight. Chain is in place and works as designed. Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Manhole	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).
Catch Basin	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(5) Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin).	Top slab is free of holes and cracks. Frame is sit-

Table V-4.5.2(5) Maintenance Standards - Catch Basins (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	ting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regrouted and secure at basin wall.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See "Detention Ponds" (No. 1).	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
	Locking Mechanism Not	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into	Mechanism opens with

Table V-4.5.2(5) Maintenance Standards - Catch Basins (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
	Working	frame have less than 1/2 inch of thread.	proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

Table V-4.5.2(6) Maintenance Standards - Debris Barriers (e.g., Trash Racks)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
Metal	Damaged/ Missing	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4

Table V-4.5.2(6) Maintenance Standards - Debris Barriers (e.g., Trash Racks) (continued)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
	Bars.	Bars are missing or entire barrier missing. Bars are loose and rust is causing 50% deterioration to any part of barrier.	inch. Bars in place according to design. Barrier replaced or repaired to design standards.
	Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe	Barrier firmly attached to pipe

Table V-4.5.2(7) Maintenance Standards - Energy Dissipaters

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
External:			
Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Rock pad replaced to design standards.
	Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/-flushed so that it matches design.
	Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench redesigned or rebuilt to standards.
	Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Perforated pipe cleaned or replaced.

Table V-4.5.2(7) Maintenance Standards - Energy Dissipaters (continued)

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
	Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility rebuilt or redesigned to standards.
	Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
Internal:			
Manhole/Chamber	Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to 1/2 of original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Structure replaced to design standards.
	Other Defects	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(8) Maintenance Standards - Typical Biofiltration Swale

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits on grass treatment area of the bio-swale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
	Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet

Table V-4.5.2(10) Maintenance Standards - Filter Strips (continued)

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
		ation starts to take over.	
	Trash and Debris Accumulation	Trash and debris accumulated on the filter strip.	Remove trash and Debris from filter.
	Erosion/Scouring	Eroded or scoured areas due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the filter strip should be re-graded and re-seeded. For smaller bare areas, over-seed when bare spots are evident.
	Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire filter width.	Level the spreader and clean so that flows are spread evenly over entire filter width.

Table V-4.5.2(11) Maintenance Standards - Wetponds

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Water level	First cell is empty, doesn't hold water.	Line the first cell to maintain at least 4 feet of water. Although the second cell may drain, the first cell must remain full to control turbulence of the incoming flow and reduce sediment resuspension.
	Trash and Debris	Accumulation that exceeds 1 CF per	Trash and debris removed from pond.

Table V-4.5.2(11) Maintenance Standards - Wetponds (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
		1000-SF of pond area.	
	Inlet/Outlet Pipe	Inlet/Outlet pipe clogged with sediment and/or debris material.	No clogging or blockage in the inlet and outlet piping.
	Sediment Accumulation in Pond Bottom	Sediment accumulations in pond bottom that exceeds the depth of sediment zone plus 6-inches, usually in the first cell.	Sediment removed from pond bottom.
	Oil Sheen on Water	Prevalent and visible oil sheen.	Oil removed from water using oil-absorbent pads or vactor truck. Source of oil located and corrected. If chronic low levels of oil persist, plant wetland plants such as Juncus effusus (soft rush) which can uptake small concentrations of oil.
	Erosion	Erosion of the pond's side slopes and/or scouring of the pond bottom, that exceeds 6-inches, or where continued erosion is prevalent.	Slopes stabilized using proper erosion control measures and repair methods.
	Settlement of Pond Dike/Berm	Any part of these components that has settled 4-inches or lower than the design elevation, or inspector determines dike/berm is unsound.	Dike/berm is repaired to specifications.
	Internal Berm	Berm dividing cells should be level.	Berm surface is leveled so that water flows evenly over entire length of

Table V-4.5.2(11) Maintenance Standards - Wetponds (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
			berm.
	Overflow Spillway	Rock is missing and soil is exposed at top of spillway or outside slope.	Rocks replaced to specifications.

Table V-4.5.2(12) Maintenance Standards - Wetvaults

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash/Debris Accumulation	Trash and debris accumulated in vault, pipe or inlet/outlet (includes floatables and non-floatables).	Remove trash and debris from vault.
	Sediment Accumulation in Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6-inches.	Remove sediment from vault.
	Damaged Pipes	Inlet/outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
	Access Cover Damaged/Not Working	Cover cannot be opened or removed, especially by one person.	Pipe repaired or replaced to proper working specifications.
	Ventilation	Ventilation area blocked or plugged.	Blocking material removed or cleared from ventilation area. A specified % of the vault surface area must provide ventilation to the vault interior (see design specifications).
	Vault Structure Damage - Includes Cracks in Walls Bottom, Damage to	Maintenance/inspection personnel determine that the vault is not structurally sound. Cracks wider than 1/2-	Vault replaced or repairs made so that vault meets design specifications and is structurally sound. Vault repaired so that no cracks

Table V-4.5.2(17) Maintenance Standards - Coalescing Plate Oil/Water Separators (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
		Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	inlet/outlet pipe.
	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.

Table V-4.5.2(18) Maintenance Standards - Catch Basin Inserts

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Sediment Accumulation	When sediment forms a cap over the insert media of the insert and/or unit.	No sediment cap on the insert media and its unit.
	Trash and Debris Accumulation	Trash and debris accumulates on insert unit creating a blockage/restriction.	Trash and debris removed from insert unit. Runoff freely flows into catch basin.
	Media Insert Not Removing Oil	Effluent water from media insert has a visible sheen.	Effluent water from media insert is free of oils and has no visible sheen.
	Media Insert Water Saturated	Catch basin insert is saturated with water and no longer has the capacity to absorb.	Remove and replace media insert
	Media Insert-Oil Saturated	Media oil saturated due to petroleum spill that drains into catch basin.	Remove and replace media insert.
	Media Insert Use Beyond Product Life	Media has been used beyond the typical average life of media insert product.	Remove and replace media at regular intervals, depending on insert product.

GEOTECHNICAL REPORT

Barajas Property
18830 – 134th Street SE
Monroe, Washington

Project No. T-8064

Terra Associates, Inc.

No comments or revisions requested.
T. Gathmann
4/10/2019

Prepared for:

D.R. Horton
Kirkland, Washington

December 4, 2018

TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

December 4, 2018
Project No. T-8064

Ms. Katie Stecks
D.R. Horton
11241 Slater Avenue NE, Suite 200
Kirkland, Washington 98033

Subject: Geotechnical Report
Barajas Property
18830 – 134th Street SE
Monroe, Washington

Dear Ms. Stecks:

As requested, we conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design and construction.

The soils observed in our subsurface explorations are glacial deposits comprised predominantly of medium dense to dense silty sand with gravel interpreted to be weathered till overlying unweathered till deposits consisting of dense to very dense, moderately- to strongly-cemented silty sand with gravel and occasional cobbles. We observed light to moderate seepage of perched groundwater in eight of the nine test pits.

In our opinion, there are no geotechnical conditions that would preclude development of the site, as currently planned. The residences can be supported on conventional spread footings bearing on competent native soils on structural fill placed on the competent native soils. Floor slabs and pavements can be similarly supported.

Detailed recommendations addressing these issues and other geotechnical design considerations are presented in the attached report. We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

John C. Sadler, L.E.G., L.H.G.
Project Manager/Senior Engineering Geologist

12-4-18

Carolyn S. Decker, P.E.
Project Engineer

CAROLYN S. DECKER — STATE OF WASHINGTON — 47016 — REGISTERED PROFESSIONAL ENGINEER

12220 113th Avenue NE, Ste. 130, Kirkland, Washington 98034
Phone (425) 821-7777 • Fax (425) 821-4334

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Geotechnical Report
Barajas Property
18830 – 134th Street SE
Monroe, Washington

1.0 PROJECT DESCRIPTION

The proposed project is a residential subdivision. An unreferenced, undated site plan provided to us indicates the development will consist of 22 single-family lots with associated infrastructure and access improvements. The site will be accessed off of 134th Street SE by a new roadway that terminates at a cul-de-sac in the south-central portion of the site. Stormwater runoff collected from the development will be conveyed to a detention facility in the southwestern portion of the site. The plan does not indicate the type of detention facility that will be used. Site grading and building plans are currently not available. Based on the sloping surface gradients, we expect that moderate cuts and fills will be required to establish building pad and roadway elevations.

We expect that the residences will be two- to three-story wood-frame structures with the main floor levels constructed at grade or framed over a crawl space. We anticipate that foundation loads would be relatively light, in the range of 2 to 3 kips per foot for bearing walls and 25 to 50 kips for isolated columns.

The recommendations contained in the following sections of this report are based on these design features. We should review design drawings and specifications as they are developed to verify that our recommendations are valid for the proposed construction, and to amend or modify our report, as necessary.

2.0 SCOPE OF WORK

We explored subsurface conditions at the site in nine test pits excavated to depths about four to eight feet below ground surface using a track-mounted excavator. Using the results of our subsurface exploration and laboratory testing, analyses were undertaken to develop geotechnical recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions
- Geologic hazards per the City of Monroe Municipal Code
- Seismic design parameters per the 2015 International Building Code (IBC)
- Site preparation and grading
- Excavations
- Foundations

- Slab-on-grade floors
- Stormwater facilities
- Infiltration feasibility
- Drainage
- Utilities
- Pavements

It should be noted that recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment is beyond Terra Associates' purview. A building envelope specialist or contactor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The site is an approximately 4.76-acre parcel located south of and adjacent to 134th Street SE, approximately 670 feet to 1,000 feet west of the intersection with 191st Avenue SE in Monroe, Washington. The site location is shown on Figure 1.

A single-family residence and a detached garage occupy the north-central and northeastern portions of the site, respectively. Existing surface gradients generally slope down to the south at gentle to moderate inclinations. Vegetation in the northern portion of the site consists primarily of grass lawn and landscape trees and shrubs. The southern portion of the site is vegetated primarily with thick brush and scattered mature coniferous and deciduous trees.

We observed a localized wet area in the east-central portion of the site. The wet area is located immediately downgradient from a corrugated plastic pipe emerging from a pad of cobble-size rocks that appears to be a surface discharge point for one or more drains installed at the site.

3.2 Soils

The soils observed in our subsurface explorations are glacial deposits comprised predominantly of medium dense to dense silty sand with gravel interpreted to be weathered till overlying unweathered till deposits consisting of dense to very dense, moderately- to strongly-cemented silty sand with gravel and occasional cobbles. Eight of the nine test pits terminated in dense to very dense till encountered below depths of about 2.5 to 6 feet. Test Pit TP-1 terminated in a dense, weakly to moderately cemented, outwash-like sand with silt and gravel unit that is interpreted to be an ice-contact deposit. We were unable to determine the vertical extent of the sand with silt and gravel unit due to localized groundwater seepage and caving.

We observed about 1 to 3 feet of loose to medium dense silt to sandy silt containing trace to scattered amounts of gravel in Test Pits TP-6 and TP-7. The silt unit overlies till and till-like soils at both locations and is also interpreted to be an ice contact deposit.

The *Surficial geologic map of the Skykomish and Snoqualmie Rivers area, Snohomish and King Counties, Washington*, by D.B. Booth, 1990, shows the site mapped as Vashon till (Qvt). The dense to very dense silty sand with gravel observed in the test pits is consistent with this geologic unit.

Detailed descriptions of the subsurface conditions we observed in our site explorations are presented on the Test Pit Logs in Appendix A. The approximate test pit locations are shown on Figure 2.

3.3 Groundwater

We observed light to moderate groundwater seepage in 8 of the 9 test pits that was generally perched above the till between depths of about 2 and 2.5 feet. Exceptions to this include moderate groundwater seepage observed between about 3 and 4 feet in Test Pit TP-1 that appeared to be perched above the dense outwash-like sand with silt and gravel, and in Test Pit TP-9 where groundwater is perched on dense till-like soil about 0.3 feet below ground surface.

The occurrence of shallow perched groundwater is typical for sites underlain by relatively impermeable till and till-like soils. We expect that perched groundwater levels and flow rates at the site will fluctuate seasonally, with highest levels typically developing during the wet winter months (October through May).

3.4 Geologic Hazards

We evaluated site conditions for the presence of geologic hazards as designated by Chapter 20.05.120 (Geologically hazardous areas) of the City of Monroe Municipal Code (MMC). Geologically hazardous areas are defined by the MMC as areas susceptible to erosion, sliding, earthquake, or other geological events and include erosion hazard areas, landslide hazard areas, seismic hazard areas, and other geological events including tsunami, mass wasting, debris flows, rock falls, and differential settlement.

3.4.1 Erosion Hazard Areas

Section 20.05.120.B.1 of the MMC defines erosion hazard areas as "...at least those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having "severe" or "very severe" rill and inter-rill erosion hazard."

The Natural Resources Conservation Service (NRCS) has mapped the site soils as *Tokul gravelly medial loam, 0 to 8 percent slopes* and *Tokul gravelly medial loam, 8 to 15 percent slopes.* The erosion hazard of both soil types is described by the NRCS as slight, which does not meet the definition of an erosion hazard area given above.

We did not observe any indications of significant active erosion at the site; however, the site soils will be susceptible to erosion when exposed during development. In our opinion, the erosion potential of the site soils would be adequately mitigated with proper implementation and maintenance of Best Management Practices (BMPs) for erosion prevention and sedimentation control in the planned development area. BMPs for erosion prevention and sedimentation control will need to be in place prior to and during site development, and should be maintained until permanent site stabilization measures are in place. All BMPs for erosion prevention and sedimentation control should conform to City of Monroe requirements.

3.4.2 Landslide Hazard Areas

Section 20.05.120.B.2 of the MCC defines landslide hazard areas as "...areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Examples of these may include, but are not limited to, the following:

a. Areas of historic failure, such as:
   i. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "severe" limitation for building site development.
   ii. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Department of Natural Resources.

b. Areas with all three of the following characteristics:
   i. Slopes steeper than 15 percent.
   ii. Hillsides intersecting geologic contacts with a relatively permeable sediment overlaying a relatively impermeable sediment or bedrock.
   iii. Springs or groundwater seepage.

c. Areas that have shown movement during the Holocene epoch (from ten thousand years ago to the present) or that are underlain or covered by mass wastage debris of that epoch.

d. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and faults) in subsurface materials.

e. Slopes having a gradient steeper than 80 percent subject to rock fall during seismic shaking.

f. Areas potentially unstable because of rapid stream incision, stream bank erosion, and undercutting by wave action.

g. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding.

h. Any area with a slope of forty percent or steeper and with a vertical relief of ten or more feet except areas composed of consolidated rock. A slope delineated by establishing its toe and top and measured by averaging the inclination over at least ten feet of vertical relief."

We did not observe conditions meeting the above criteria at the site. In our opinion, the site conditions are not susceptible to landsliding and no landslide hazard exists.

3.4.3 Seismic Hazard Areas

Section 20.05.120.B.3 of the MCC defines defines seismic hazard areas as areas that are "...subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface failure."

The closest known Class A fault (existence of Quaternary fault of tectonic origin demonstrated by geologic evidence) to the project site is the southern Whidbey Island fault zone (SWIFZ). The SWIFZ is described as a northwest-trending (average strike N51°W), 5- to 7-kilometer wide fault zone that extends more than 65 kilometers from the Strait of Juan de Fuca southeast to Mukilteo on the eastern side of Possession Sound.

The subject site is located about 7.5 miles northeast of the north fault strand mapped by the USGS. We did not observe any indications of faulting or surface rupture at the project site and are unaware of any reported documentation of surface rupture due to past movement along the SWIFZ in the project area. Considering this, it is our opinion that the potential for ground rupture at the project site during a severe seismic event is negligible.

Based on the soil and groundwater conditions we observed in our subsurface explorations, it is our opinion that there is no risk for damage resulting from seismically induced slope failure, settlement, soil liquefaction, or lateral spreading. In our opinion, unusual seismic hazard areas do not exist at the site and design in accordance with local building codes for determining seismic forces would adequately mitigate impacts associated with ground shaking.

3.4.4 Other Geologically Hazardous Areas

In our opinion, the site is not susceptible to potential hazards resulting from geologically hazardous events described in Section 20.05.120.B.4 of the MCC that include tsunami, mass wasting, debris flows, rock falls, and differential settlement.

3.5 Seismic Design Parameters

Based on the site soil conditions and our knowledge of the area geology, per the 2015 International Building Code (IBC), site class "C" should be used in structural design. Based on this site class, in accordance with the IBC, the following parameters should be used in computing seismic forces:

Seismic Design Parameters (2015 IBC)

Spectral response acceleration (Short Period), S_{Ms}	1.185 g
Spectral response acceleration (1 – Second Period), S_{M1}	0.606 g
Five percent damped .2 second period, S_{Ds}	0.790 g
Five percent damped 1.0 second period, S_{D1}	0.404 g

The above values were determined for Latitude 47.874734°N and Longitude -121.977252°W using the USGS Ground Motion Parameter Calculator web site accessed November 29, 2018 at the web site http://earthquake.usgs.gov/designmaps/us/application.php.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

Based on our study, there are no geotechnical conditions that would preclude the planned development. The residences can be supported on conventional spread footings bearing on competent native soils underlying organic topsoil, or on structural fill placed on the competent native soils. Floor slabs and pavements can be similarly supported.

The site soils contain a sufficient amount of fines (silt- and clay-sized particles) such that they will be difficult to compact as structural fill when too wet or too dry. Accordingly, the ability to use the soils from site excavations as structural fill will depend on their moisture content and the prevailing weather conditions at the time of construction, and the ability of the contractor to properly moisture condition the soil. If grading activities will take place during the winter season, the owner should be prepared to import free-draining granular material for use as structural fill and backfill.

Undisturbed bearing surfaces composed of the native silt observed in Test Pits TP-6 and TP-7, or structural fill derived from the native silt, would typically provide suitable support for conventional spread footing foundations, floor slabs, and pavements; however, the soils will be easily disturbed by normal construction activity, particularly when wet. If disturbed, the soil will not be suitable for support, and the affected material would need to be removed with the foundations lowered to obtain support on an undisturbed soil subgrade. Alternatively, the soils can be removed, and grade restored with structural fill.

Based on our observations, it appears that a moderate perched groundwater condition exists beneath the site that may persist throughout much of the year. Considering this, it would be prudent for the contractor to anticipate the need for some initial construction drainage and soil moisture conditioning efforts to facilitate site grading.

Detailed recommendations regarding these issues and other geotechnical design considerations are provided in the following sections of this report. These recommendations should be incorporated into the final design drawings and construction specifications. Terra Associates, Inc. should review proposed building and grading plans for the project when available to verify that our geotechnical recommendations have been properly interpreted and incorporated into the project design, and to provide additional or alternate recommendations, if needed.

4.2 Site Preparation and Grading

To prepare the site for construction, all vegetation, organic surface soils, and other deleterious materials should be stripped and removed from the site. We expect surface stripping depths of about four to eight inches will generally be required to remove the organic surficial soils in the planned development areas; however, about two feet of dark brown organic silty sand was observed in Test Pit TP-7. Stripped vegetation debris should be removed from the site. Organic soils will not be suitable for use as structural fill, but may be used for limited depths in nonstructural areas or for landscaping purposes.

In the developed portions of the site, demolition of existing structures should include removal of existing foundations and abandonment of underground septic systems and other buried utilities. Abandoned utility pipes that fall outside of new building areas can be left in place provided they are sealed to prevent intrusion of groundwater seepage and soil.

Once clearing and grubbing operations are complete, cut and fill operations to establish desired building grades can be initiated. A representative of Terra Associates, Inc. should examine all bearing surfaces to verify that conditions encountered are as anticipated and are suitable for placement of structural fill or direct support of building and pavement elements. Our representative may request proofrolling exposed surfaces with a heavy rubber-tired vehicle to determine if any isolated soft and yielding areas are present. If unstable yielding areas are observed, they should be cut to firm bearing soil and filled to grade with structural fill. If the depth of excavation to remove unstable soils is excessive, use of geotextile fabric such as Mirafi 500X or equivalent in conjunction with structural fill can be considered in order to limit the depth of removal. In general, our experience has shown that a minimum of 18 inches of clean, granular structural fill over the geotextile fabric should establish a stable bearing surface.

We anticipate that most of the site soils will be suitable for use as structural fill provided they are properly moisture conditioned when placed. As discussed, the ability to use the native soils, particularly the observed silt soils, as structural fill will depend on the soil's moisture content when excavated, the prevailing weather conditions during site grading, and the ability of the contractor to properly moisture condition the soil. During the normally dry summer months, it may be possible to dry soils that are wet of optimum by aeration. As an alternative, stabilizing the moisture in the native soil with cement or lime can be considered. If soil amendment products are used, additional Temporary Erosion and Sedimentation Control (TESC) BMPs will need to be implemented to mitigate potential impacts to stormwater runoff associated with possible elevated pH levels. Moisture conditioning of soils that are dry of optimum would require the addition of water to the soils and thoroughly blending the material prior to compaction.

If grading activities are planned during the wet winter months, or if they extend into fall and winter, the owner should be prepared to import wet weather structural fill. For this purpose, we recommend importing a granular soil that meets the following grading requirements:

U.S. Sieve Size	Percent Passing
6 inches	100
No. 4	75 maximum
No. 200	5 maximum*

*Based on the 3/4-inch fraction.

Prior to use, Terra Associates, Inc. should examine and test all materials planned to be imported to the site for use as structural fill.

Structural fill should consist of properly moisture conditioned material that is placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-698 (Standard Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this ASTM standard. In our opinion, reducing the lift thickness to a maximum of six inches and using a sheep's-foot roller to compact the fill will improve the ability to achieve adequate compaction of the fine grained soils.

4.3 Slopes and Embankments

All permanent cut and fill slopes should be graded with a finished inclination of no greater than 2:1 (Horizontal:Vertical). Upon completion of grading, the slope face should be appropriately vegetated or provided with other physical means to guard against erosion. Final grades at the top of the slope must promote surface drainage away from the slope crest. Water must not be allowed to flow uncontrolled over the slope face. If surface runoff must be directed towards the top of a slope, it may be necessary to route collected water to an appropriate point of discharge beyond the toe in a closed system.

Embankment fills placed on slopes exceeding a grade of 20 percent must be keyed and benched into competent native soils. A generalized slope fill detail is shown on Figure 3. At a minimum, we recommend constructing a toe drain in the key trench for the fill embankment. The locations and extent of such toe drains will be best determined in the field at the time of construction. All fill placed for embankment construction should meet the structural fill requirements provided in Section 4.2 of this report.

4.4 Excavations

All excavations at the site associated with confined spaces, such as lower building level retaining walls, must be completed in accordance with local, state, and federal requirements. Based on the Washington State Safety and Health Administration (WSHA) regulations the medium dense to dense native soils would typically be classified as Type C soils. Very dense, cemented till and till-like soils would be classified as Type A soil.

Accordingly, for temporary excavations of more than 4 feet and less than 20 feet in depth, the side slopes in Type C soils should be laid back at a slope inclination of 1.5:1 (Horizontal:Vertical) or flatter. Side slopes in Type A soils can be laid back at a slope inclination of 0.75:1 or flatter. For temporary excavation slopes less than 8 feet in height in Type A soils, the lower 3.5 feet can be cut to a vertical condition, with a 0.75:1 slope graded above. For temporary excavation slopes greater than 8 feet in height up to a maximum height of 12 feet, the slope above the 3.5-foot vertical portion will need to be laid back at a minimum slope inclination of 1:1. No vertical cut with a backslope immediately above is allowed for excavation depths that exceed 12 feet. In this case, a four-foot vertical cut with an equivalent horizontal bench to the cut slope toe is required. If there is insufficient room to complete the excavations in this manner, or if excavations greater than 20 feet deep are planned, you may need to use temporary shoring to support the excavations.

Based on our field observations, seepage of perched groundwater should be anticipated within site excavations completed during the wet winter and spring months. In our opinion, the volume of water and rate of flow into site excavations should be relatively minor and would not be expected to impact the stability of the excavations when completed as described above. Conventional sump pumping procedures along with a system of collection trenches, if necessary, should be capable of maintaining a relatively dry excavation for construction purposes in these soils.

The above information is provided solely for the benefit of the owner and other design consultants, and should not be construed to imply that Terra Associates, Inc. assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

4.5 Foundations

The residential structures may be supported on conventional spread footing foundations bearing on competent native materials or on structural fill placed on a competent native material subgrade. Foundation subgrades should be prepared as recommended in Section 4.2 of this report. Perimeter foundations exposed to the weather should bear at a minimum depth of 1.5 feet below final exterior grades for frost protection. Interior foundations can be constructed at any convenient depth below the floor slab.

We recommend designing foundations bearing on competent soils for a net allowable bearing capacity of 2,500 pounds per square foot (psf). For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used in design. With the anticipated loads and this bearing stress applied, building settlements should be less than one-half inch total and one-fourth inch differential.

For designing foundations to resist lateral loads, a base friction coefficient of 0.35 can be used. Passive earth pressure acting on the sides of the footings may also be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 350 pounds per cubic foot (pcf). We recommend not including the upper 12 inches of soil in this computation because they can be affected by weather or disturbed by future grading activity. This value assumes the foundations will be constructed neat against competent native soil or the excavations are backfilled with structural fill, as described in Section 4.2 of this report. The recommended passive and friction values include a safety factor of 1.5.

4.6 Slab-on-Grade Floors

Slab-on-grade floors may be supported on a subgrade prepared as recommended in Section 4.2 of this report. Immediately below the floor slab, we recommend placing a four-inch thick capillary break layer composed of clean, coarse sand or fine gravel that has less than three percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting uniform curing of the slab and can actually serve as a water supply for moisture seeping through the slab and affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained.

4.7 Lateral Earth Pressures for Below-Grade Walls

The magnitude of earth pressures developing on below-grade walls will depend on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as described in Section 4.2 of this report. To prevent overstressing the walls during backfilling, heavy construction machinery should not be operated within five feet of the wall. Wall backfill in this zone should be compacted with hand-operated equipment. To prevent hydrostatic pressure development, wall drainage must also be installed. A typical wall drainage detail is shown on Figure 4.

With wall backfill placed and compacted as recommended, and drainage properly installed, we recommend designing unrestrained walls for an active earth pressure equivalent to a fluid weighing 35 pounds per cubic foot (pcf). For restrained walls, an additional uniform load of 100 psf should be added to the 35 pcf. To account for typical traffic surcharge loading, the walls can be designed for an additional imaginary height of two feet (two-foot soil surcharge). For evaluation of wall performance under seismic loading, a uniform pressure equivalent to 8H psf, where H is the height of the below-grade portion of the wall should be applied in addition to the static lateral earth pressure. These values assume a horizontal backfill condition and that no other surcharge loading, sloping embankments, or adjacent buildings will act on the wall. If such conditions exist, then the imposed loading must be included in the wall design. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 4.5 of this report.

Gravity block or mechanically stabilized earth (MSE) walls can also be used to accommodate vertical breaks in grade that may be required to achieve desired site elevations. We can design or provide soil design parameters for a design build approach for these alternative wall systems, if requested.

4.8 Infiltration Feasibility

Based on our study, it is our opinion that on-site infiltration is not a feasible alternative for management of site stormwater due to the presence of relatively-impermeable till and till-like soils at relatively shallow depths beneath the ground surface.

There may be opportunities to infiltrate limited amounts of site stormwater in the medium dense soils observed in the upper 2 to 2.5 feet of several of the test pits using Low Impact Development (LID) natural drainage practices (NDPs). The feasibility of using NDPs at the site should be based on field conditions observed at the time of site grading.

4.9 Stormwater Facilities

We understand that site stormwater will be routed to a detention vault or detention pond located in the southwestern portion of the planned development area. Conceptual design information is currently not available. Terra Associates, Inc. should review site development plans when available to verify that our recommendations are appropriate for the vault or pond design, and to provide additional or alternate recommendations, if necessary.

Detention Vault

If on-site detention will be provided by a buried vault, we expect that very dense, cemented till would be exposed throughout the bottom of the vault excavation. Vault foundations supported by these native soils may be designed for an allowable bearing capacity of 6,000 psf provided that the foundation subgrade is at least 8 feet below finished grade adjacent to the vault. For short-term loads, such as seismic, a one-third increase in this allowable capacity can be used. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 4.5.

The magnitude of earth pressures developing on the vault walls will depend in part on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as recommended in the Section 4.2 of this report. Lateral earth pressures recommended in Section 4.7 can be used in designing the below-grade vault walls. If it is not possible to discharge collected water at the footing elevation, we recommend setting the invert elevation of the wall drainpipe equivalent to the outfall invert and connecting the drain to the outfall pipe for discharge. For any portion of the wall that falls below the invert elevation of the wall drain, an earth pressure equivalent to a fluid weighing 85 pcf should be used. For evaluating walls under seismic loading, an additional uniform earth pressure equivalent to 8H psf, where H is the height of the below-grade wall in feet, can be used. These values assume a horizontal backfill condition. Where applicable, a uniform horizontal traffic surcharge value of 75 psf should be included in design of vault walls.

The vault may be subject to uplift pressures if drainage is not provided the full depth of the structure. The weight of the structure and the weight of the backfill soil above its foundation will provide resistance to uplift. A soil unit weight of 125 pcf can be used for the vault backfill provided the backfill is placed and compacted as structural fill as recommended above.

Detention Pond

We anticipate that pond construction would consist primarily of cuts into native soil. If fill berms will be constructed, the berm locations should be stripped of topsoil, duff, existing fill soils, and soils containing organic material prior to the placement of fill. The fill berms should be constructed by placing structural fill in layers no more than 12 inches thick, compacting each layer to a minimum of 95 percent relative compaction, as determined by ASTM Test Designation D-1557 (Modified Proctor). Material used to construct pond berms should consist predominately of granular soils with a maximum size of 3 inches and a minimum of 20 percent fines. The results of laboratory testing indicate that soils meeting this gradational requirement exist on-site. Terra Associates, Inc. should examine and test all on-site or imported materials proposed for use as berm fill prior to their use.

Because of exposure to fluctuating stored water levels, soils exposed on the interior pond slopes may be subject to some risk of periodic shallow instability or sloughing. Establishing interior slopes at a gradient of 3:1 (Horizontal:Vertical) will significantly reduce or eliminate this potential. Exterior berm slopes and interior slopes above the maximum water surface should be graded to a finished inclination no steeper than 2:1 (Horizontal:Vertical). Finished slope faces should be thoroughly compacted and vegetated to guard against erosion.

We expect that perched groundwater seepage will be intercepted by the detention pond excavation, particularly during the wet winter months. However, based on our field observations, we anticipate that the volume of groundwater that might find its way into the pond as seepage would likely be small with respect to the design volume capacity of the pond.

4.10 Drainage

Surface

Final exterior grades should promote free and positive drainage away from the building areas. We recommend providing a positive drainage gradient away from building perimeters. If a positive gradient cannot be provided, provisions for collection and disposal of surface water adjacent to the structure should be provided.

Surface water from developed areas must not be allowed to flow in an uncontrolled and concentrated manner over the crests of site slopes and embankments. Surface water should be directed away from the slope crests to a point of collection and controlled discharge. If site grades do not allow for directing surface water away from the slopes, then the water should be collected and tightlined to an approved point of controlled discharge.

Subsurface

We recommend installing a continuous drain along the outside lower edge of the perimeter building foundations. The drains can consist of four-inch diameter perforated PVC pipe that is enveloped in washed ½- to ¾-inch gravel-sized drainage aggregate that extends six inches above and to the sides of the pipe. The pipe can be laid to grade at an invert elevation equivalent to the bottom of footing grade.

The foundation drains and roof downspouts should be tightlined separately to an approved point of controlled discharge. All drains should be provided with cleanouts at easily accessible locations. These cleanouts should be serviced at least once each year.

4.11 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA) or local jurisdictional requirements. At minimum, trench backfill should be placed and compacted as structural fill as described in Section 4.2 of this report. As noted, the native soils are moisture sensitive and will require careful control of moisture to facilitate proper compaction. If utility construction takes place during the winter or if it is not feasible to properly moisture condition the excavated soil at the time of construction, it may be necessary to import suitable wet weather fill for utility trench backfilling.

4.12 Pavements

Pavements should be constructed on subgrades prepared as recommended in Section 4.2 of this report. Regardless of the degree of relative compaction achieved, the subgrade must be firm and relatively unyielding before paving. Proofrolling the subgrade with heavy construction equipment should be completed to verify this condition.

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. For traffic consisting mainly of light passenger vehicles with only occasional heavy traffic, and with a stable subgrade prepared as recommended, we recommend the following pavement sections:

- Two inches of hot mix asphalt (HMA) over four inches of crushed rock base (CRB)
- 3 ½ inches full depth HMA over prepared subgrade

The paving materials used should conform to the Washington State Department of Transportation (WSDOT) specifications for ½-inch class HMA and CRB.

Long-term pavement performance will depend on surface drainage. A poorly-drained pavement section will be subject to premature failure as a result of surface water infiltrating into the subgrade soils and reducing their supporting capability. For optimum pavement performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks when they occur.

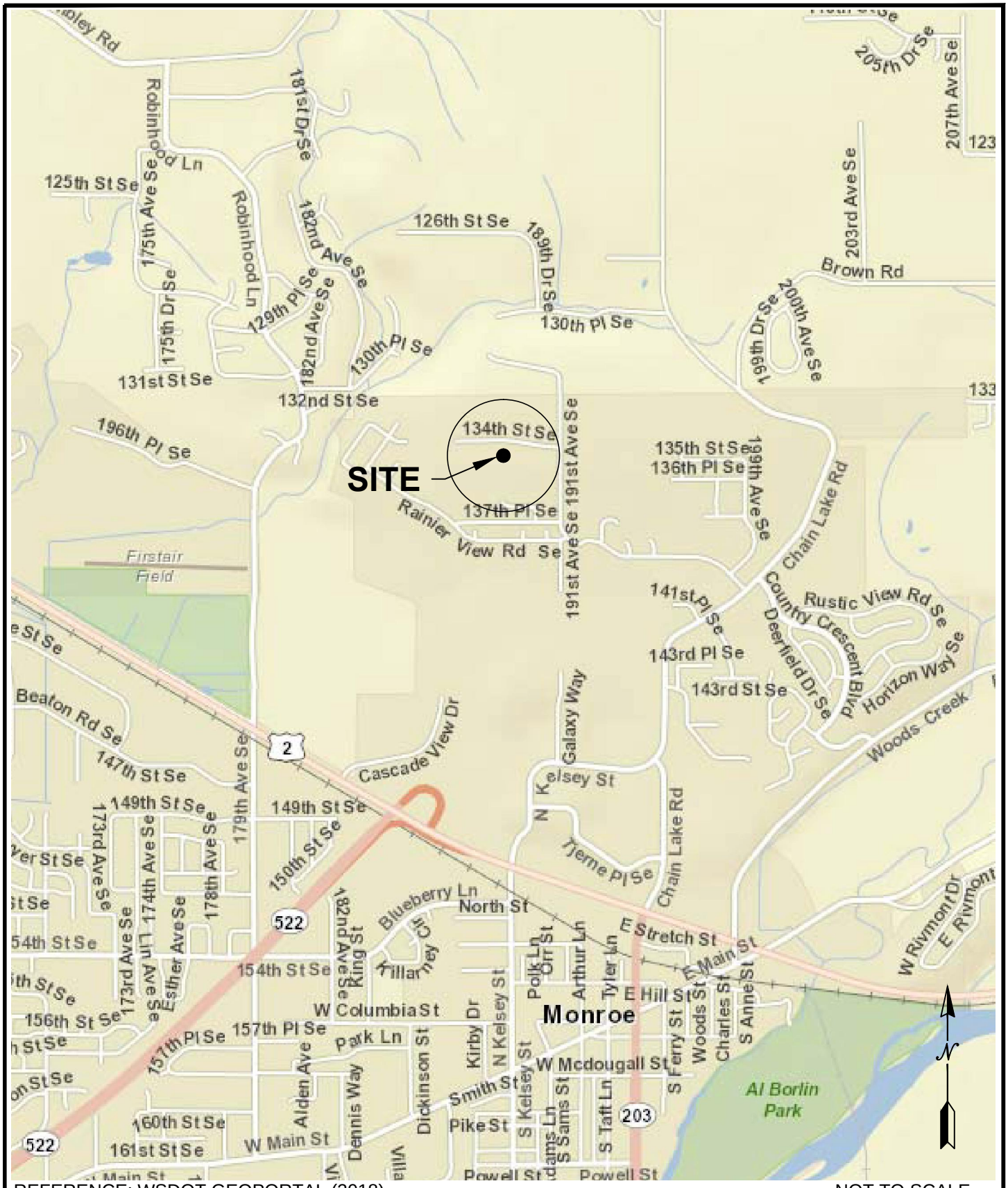
5.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review the final designs and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and implemented in project design. We should also provide geotechnical services during construction in order to observe compliance with our design concepts, specifications, and recommendations. This will allow for design changes if subsurface conditions differ from those anticipated prior to the start of construction.

6.0 LIMITATIONS

We prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. This report is the copyrighted property of Terra Associates, Inc. and is intended for specific application to the Barajas Property project in Monroe, Washington. This report is for the exclusive use of D.R. Horton and their authorized representatives. No other warranty, expressed or implied, is made.

The analyses and recommendations presented in this report are based on data obtained from the subsurface explorations completed at the site. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report, prior to proceeding with construction.



REFERENCE: WSDOT GEOPORTAL (2018)

NOT TO SCALE

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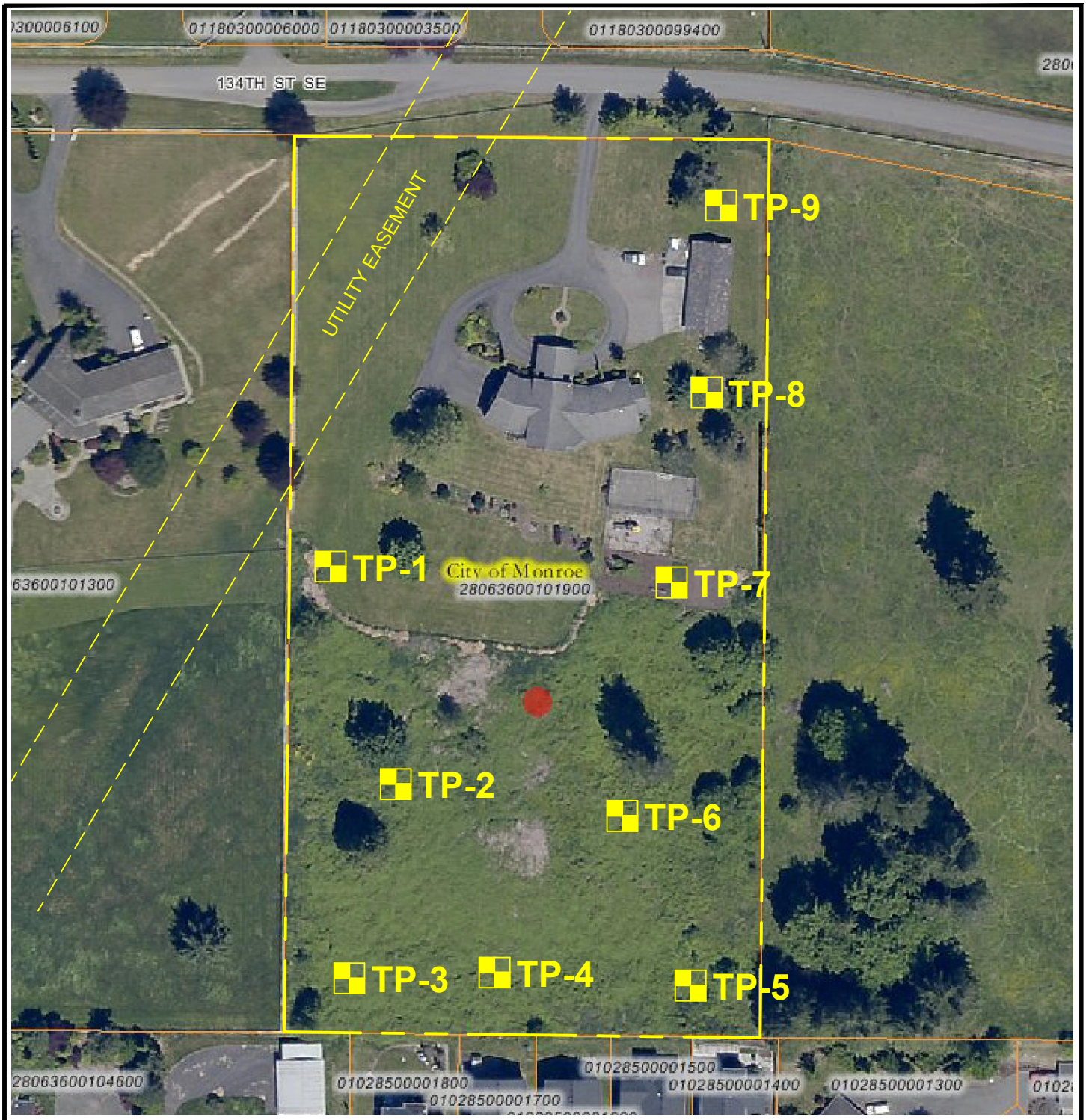
Geology and
Environmental Earth Sciences

VICINITY MAP
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 1



REFERENCE:

SCOPI

NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

LEGEND:

APPROXIMATE TEST PIT LOCATION

0 100 200

APPROXIMATE SCALE IN FEET

N

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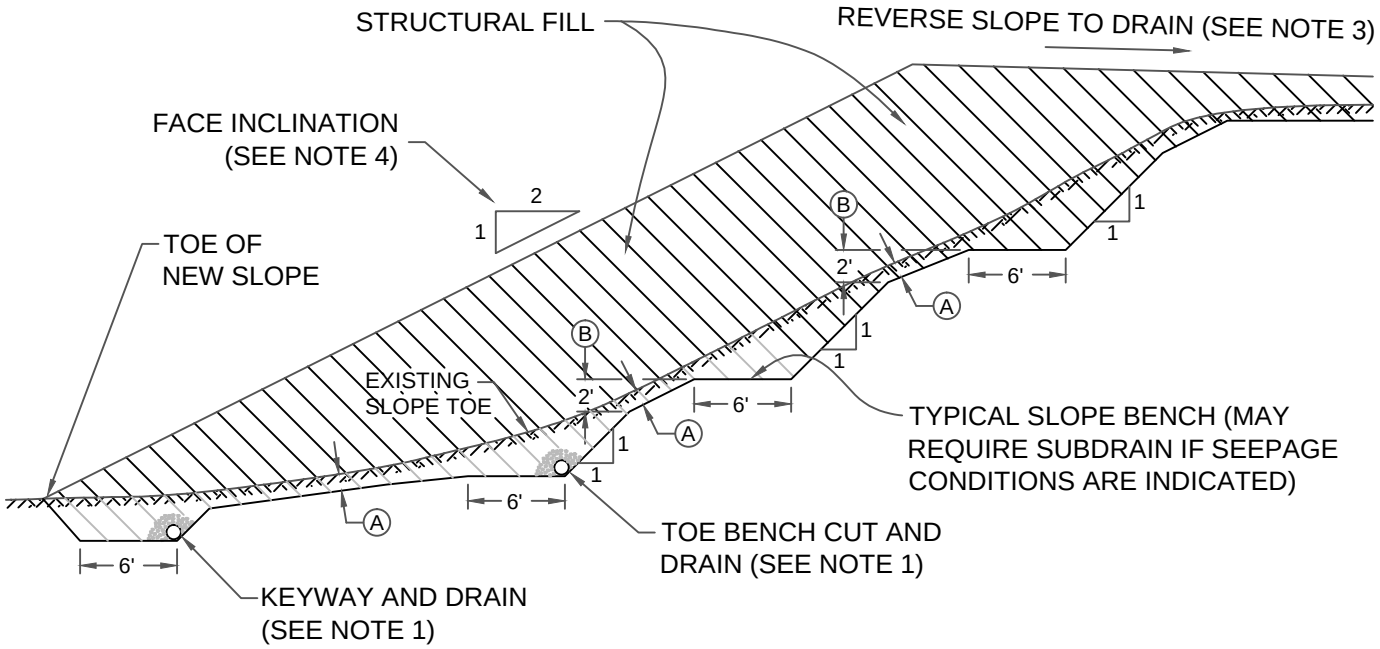
Geology and
Environmental Earth Sciences

EXPLORATION LOCATION PLAN
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 2



NOT TO SCALE

NOTES:

1) DRAINS SHALL CONSIST OF 6" DIAMETER PERFORATED PVC PIPE ENVELOPED IN 1 cu. ft. OF WASHED 3/4" MINUS DRAINAGE GRAVEL.

2) (A) – TOPSOIL REMOVAL THICKNESS BETWEEN KEYWAY AND BENCHES.

   (B) – VERTICAL ELEVATION DIFFERENCE BETWEEN TOP OF LOWER BENCH BACKCUT AND UPPER BENCH ELEVATION.

3) RECOMMENDED PRIOR TO ESTABLISHMENT OF PERMANENT EROSION CONTROL MEASURES AND SITE DRAINAGE.

4) PERMANENT FACE INCLINATION TO BE ESTABLISHED AT 2:1 (H:V) OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER

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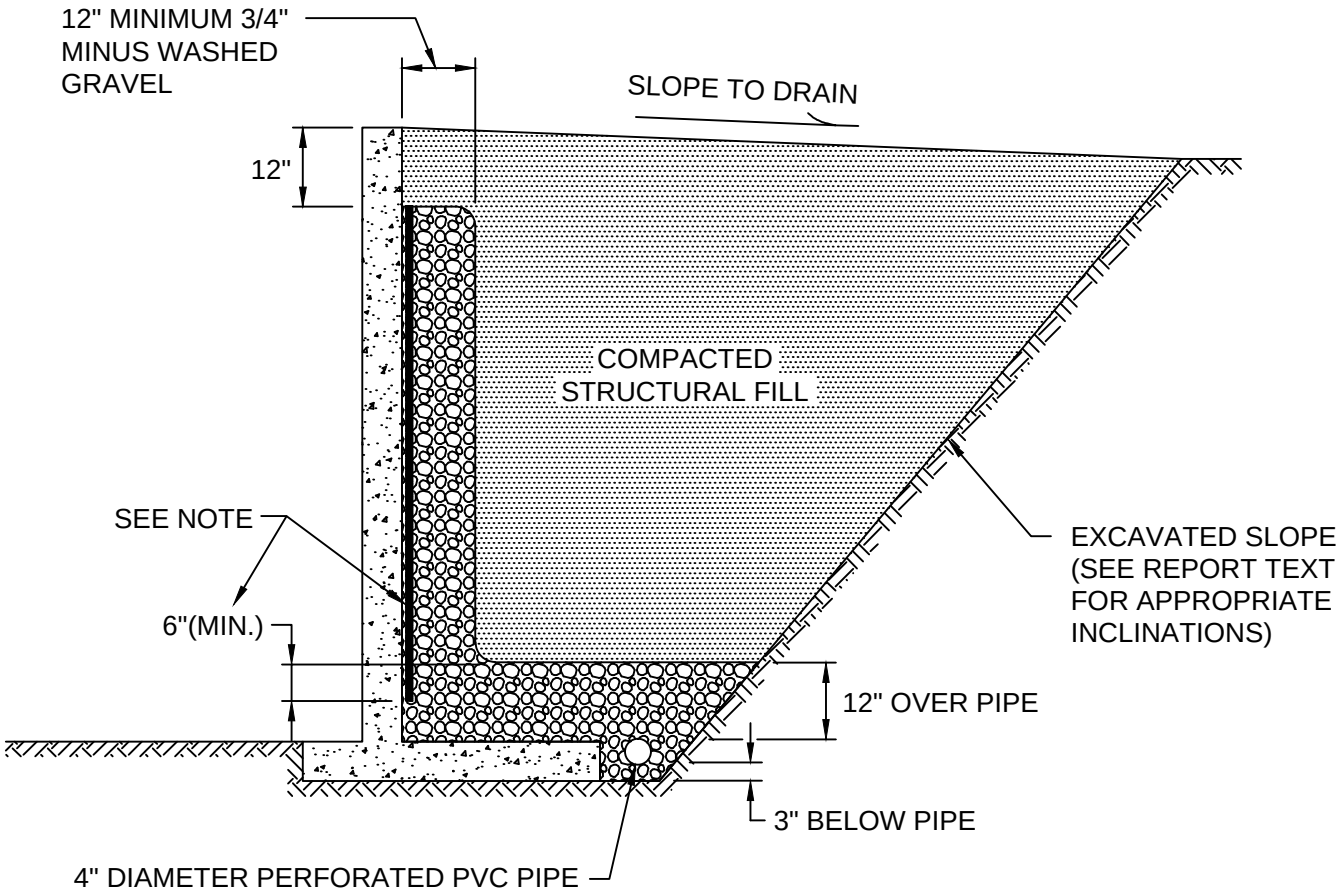
GENERALIZED SLOPE FILL DETAIL
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 3



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF 6 INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

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TYPICAL WALL DRAINAGE DETAIL
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure 4

APPENDIX A

FIELD EXPLORATION AND LABORATORY TESTING

Barajas Property
Monroe, Washington

We explored subsurface conditions at the site in 9 test pits excavated to depths about 4.5 to 6.5 feet below ground surface using a track-mounted excavator. The test pit locations are shown on Figure 2. The test pit locations were approximately determined in the field by sighting and pacing relative to existing surface features. The Test Pit Logs are presented as Figures A-2 through A-10.

An engineering geologist from our office conducted the field reconnaissance and subsurface exploration, classified the observed soils, maintained a log of each test pit, obtained representative soil samples, and performed a visual reconnaissance of the site. All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS) described on Figure A-1.

Representative soil samples obtained from the test pits were placed in sealed containers and taken to our laboratory for further examination and testing. The moisture content of each sample was measured and is reported on the Test Pit Logs. Grain size analyses were performed on six soil samples. The test results are shown on Figures A-11 and A-12.

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS More than 50% material larger than No. 200 sieve size	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
			SP	Poorly-graded sands, sands with gravel, little or no fines.
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS More than 50% material smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity. (Lean clay)
			OL	Organic silts and organic clays of low plasticity.
	SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
			CH	Inorganic clays of high plasticity. (Fat clay)
			OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
‖	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

Terra Associates, Inc.
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UNIFIED SOIL CLASSIFICATION SYSTEM
BARAJAS PROPERTY
MONROE, WASHINGTON

Proj. No.T-8064	Date DEC 2018	Figure A-1

LOG OF TEST PIT NO. TP-1

FIGURE A-2

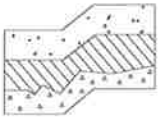
PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Lawn **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 3 to 4 Feet **DEPTH TO CAVING:** 2 to 4 Feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(6 inches SOD and TOPSOIL) Red-brown silty SAND to sandy SILT, fine grained, trace of fine gravel, moist to wet, scattered cobbles. (SM/ML)	Medium Dense	49.1
2				
3 ▼				
4		Gray-brown SAND with silt and gravel, fine to medium sand, fine to coarse gravel, moist to wet, weakly to moderately cemented, scattered cobbles. (SP-SM)	Dense	
5				
6	2	Test pit terminated at 8 feet. Moderate groundwater seepage between about 3 and 4 feet. Minor caving between about 2 and 4 feet.		11.8
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. TP-2

FIGURE A-3

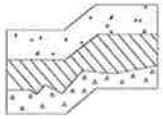
PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(6 inches DUFF and TOPSOIL) Red-brown silty SAND with gravel, fine sand, fine to coarse gravel, moist to wet, scattered cobbles. (SM)	Medium Dense	43.5
2 ▼				
3		Gray-brown silty SAND, moist to wet, mottled. (SM)	Medium Dense to Dense	
4	2	Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, moderately to strongly cemented. (SM) (Till)	Dense to Very Dense	12.3
5				
6	3	Test pit terminated at 5.5 feet. Light groundwater seepage at about 2 feet on north side of test pit.		11.8
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. TP-3

FIGURE A-4

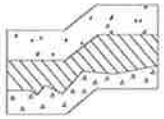
PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(6 inches DUFF and TOPSOIL) Red-brown silty SAND, fine grained, trace of fine gravel, moist to wet, scattered cobbles. (SM)	Medium Dense	6.9
2 ▼				
3		Gray-brown silty SAND, moist to wet, mottled. (SM)	Medium Dense to Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, moderately to strongly cemented, trace of cobbles. (SM) (Till)	Very Dense	
5				
6		Test pit terminated at 6 feet. Light groundwater seepage at about 2 feet.		
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. TP-4

FIGURE A-5

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		(6 inches DUFF and TOPSOIL) Red-brown silty SAND with gravel, fine sand, fine to coarse gravel, moist to wet, scattered cobbles. (SM)	Medium Dense	
2				
3		Gray-brown silty SAND with gravel, fine to coarse sand, fine to coarse gravel, moist, mottled, moderately cemented, scattered cobbles. (SM) (Till-like)	Dense to Very Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
5				
6		Test pit terminated at 6 feet. No groundwater seepage.		
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

Terra Associates, Inc.
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LOG OF TEST PIT NO. TP-5

FIGURE A-6

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 to 2.5 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		(6 inches DUFF and TOPSOIL) Dark brown organic silty SAND, fine to medium sand, trace of fine gravel, moist to wet, scattered cobbles. (OL/SM)	Loose to Medium Dense	
2		Brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet, mottled. (SM)	Medium Dense	
3		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, mottled, moderately cemented. (SM) (Till-like)	Dense to Very Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
5	1			7.9
6		Test pit terminated at 6 feet. Light groundwater seepage between about 2 and 2.5 feet.		
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

Terra Associates, Inc.
Consultants in Geotechnical Engineering Geology and Environmental Earth Sciences

LOG OF TEST PIT NO. TP-6

FIGURE A-7

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 to 2.5 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(8 inches DUFF and TOPSOIL) Brown SILT with sand and gravel to sandy SILT with gravel, fine sand, fine to coarse gravel, moist to wet. (ML)	Loose to Medium Dense	46.5
2 ▼				
3		Gray-brown SILT with sand to sandy SILT, fine sand, trace of fine to coarse gravel, moist, trace of cobbles, trace of 1.5-foot diameter boulders. (ML)	Medium Dense	
4		Gray-brown silty SAND with gravel, fine to coarse sand, fine to coarse gravel, moist, numerous cobbles, scattered boulders to 3 feet in diameter. (SM)	Dense	
5				
6		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
7		Boring terminated at 6.5 feet. Light to moderate groundwater seepage between 2 and 2.5 feet.		
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-7

FIGURE A-8

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 To 2.5 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Dark brown organic silty SAND, moist to wet. (OL/SM)	Medium Dense	
▼ 2	1	Brown sandy SILT, fine grained, wet. (ML)		52.2
3		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, mottled, moderately cemented, numerous cobbles. (SM) (Till-like)	Dense	
4		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
5	2	Test pit terminated at 5 feet. Light groundwater seepage between about 2 and 2.5 feet.		12.2
6				
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Geology and
Environmental Earth Sciences

LOG OF TEST PIT NO. TP-8

FIGURE A-9

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Brush **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 2 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
		(4 inches SOD and TOPSOIL) Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist to wet. (SM)	Medium Dense	
1				
2 ▼		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, scattered mottling, scattered cobbles. (SM)	Dense to Very Dense	
3				
		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
4				
	1	Test pit terminated at 4 feet. Light groundwater seepage at about 2 feet.		12.7
5				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Consultants in Geotechnical Engineering Geology and Environmental Earth Sciences

LOG OF TEST PIT NO. TP-9

FIGURE A-10

PROJECT NAME: Barajas Property **PROJ. NO:** T-8064 **LOGGED BY:** JCS

LOCATION: Monroe, Washington **SURFACE CONDITIONS:** Lawn **APPROX. ELEV:** N/A

DATE LOGGED: November 2, 2018 **DEPTH TO GROUNDWATER:** 0.3 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
	1	(4 inches SOD and TOPSOIL) Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, mottled, moderately cemented, numerous cobbles. (SM) (Till-like)	Dense	11.0
3		Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, strongly cemented, scattered cobbles. (SM) (Till)	Very Dense	
4		Test pit terminated at 4.5 feet. Light groundwater seepage at 0.3 feet on north side of test pit.		
5				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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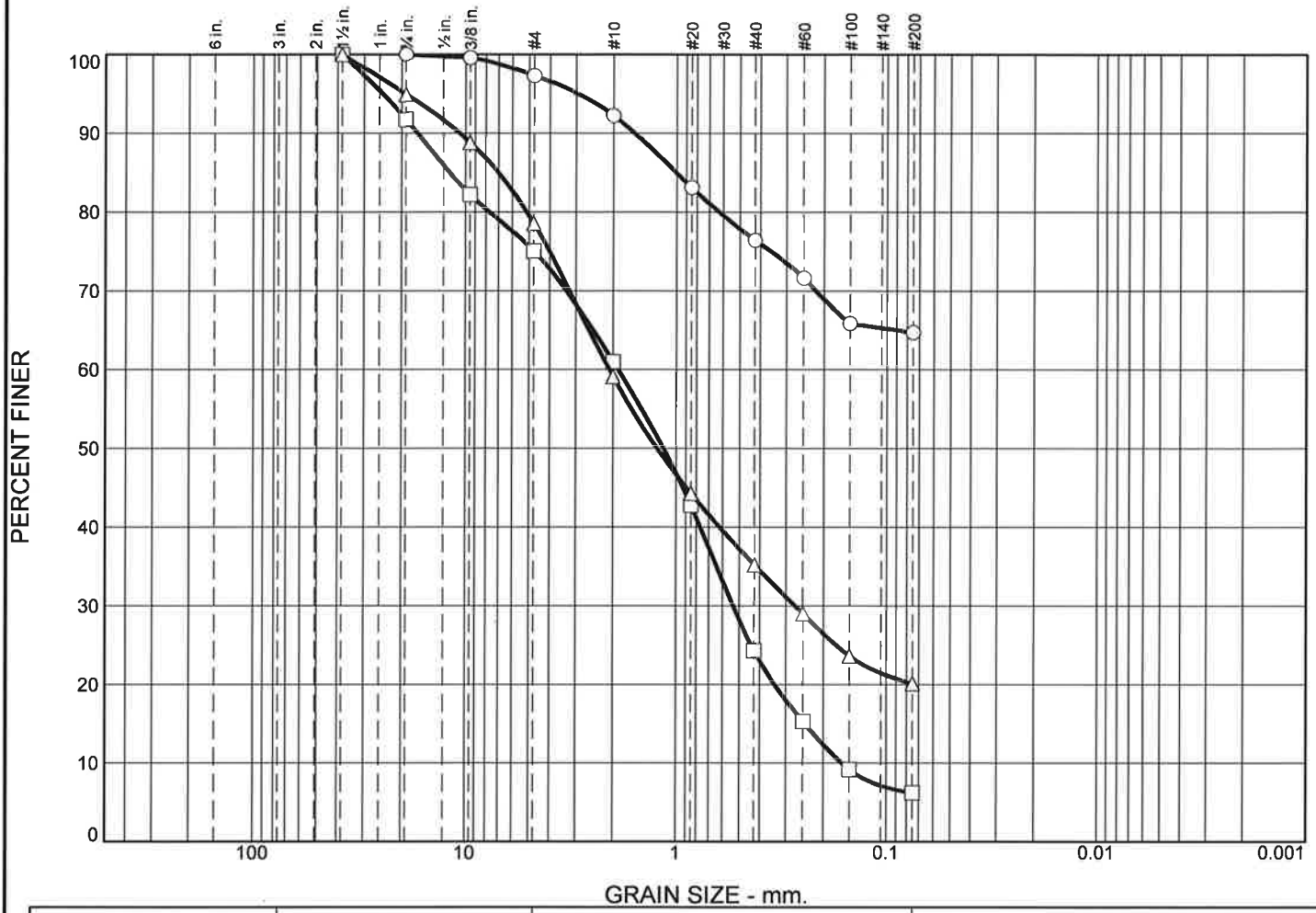
Environmental Earth Sciences

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.7	5.1	15.8	11.7	64.7	
□	0.0	8.3	16.7	14.0	36.7	18.1	6.2	
△	0.0	5.1	16.4	19.4	23.9	15.1	20.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.0083							
□			11.8597	1.8953	1.1483	0.5349	0.2447	0.1634	0.92	11.60
△			7.0146	2.0853	1.2313	0.2725				

Material Description	USCS	AASHTO
○ sandy SILT	ML	
□ SAND with silt and gravel	SP-SM	
△ silty SAND with gravel	SM	

Project No. T-8064 **Client:** D.R. Horton

Project: Barajas Property

○ **Location:** TP-1 **Depth:** 2.5'

□ **Location:** TP-1 **Depth:** 6'

△ **Location:** TP-3 **Depth:** 5'

Remarks:

○ Tested November 13, 2018

□ Tested November 13, 2018

△ Tested November 13, 2018

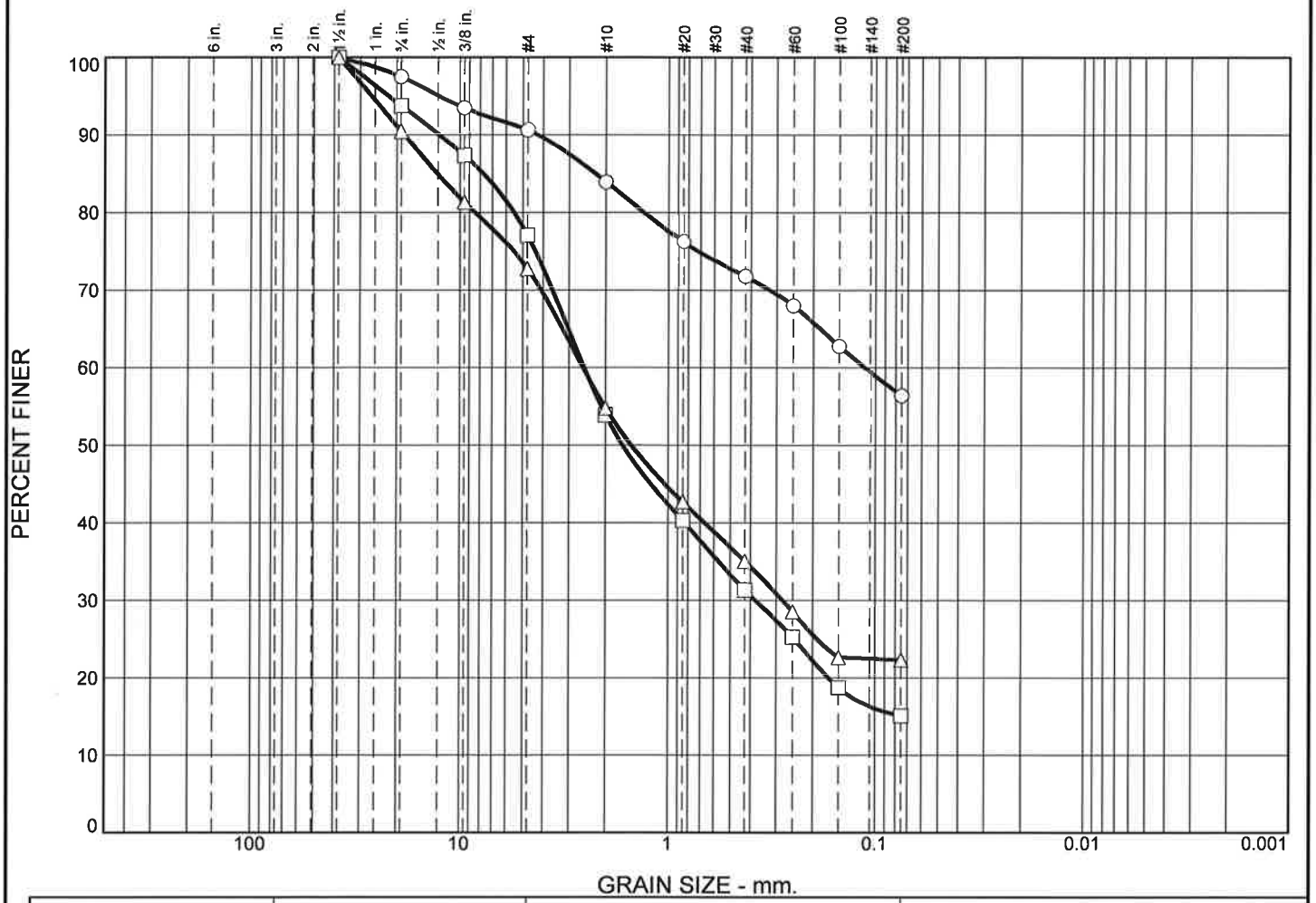
Terra Associates, Inc.

Kirkland, WA

Figure A-11

Tested By: FQ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	2.6	6.8	6.7	12.2	15.3	56.4	
□	0.0	6.3	16.7	23.1	22.6	16.2	15.1	
△	0.0	9.6	17.7	17.9	19.8	12.7	22.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.2520	0.1133						
□			7.7327	2.5352	1.6581	0.3795				
△			12.8367	2.5702	1.5085	0.2806				

	Material Description	USCS	AASHTO
○	sandy SILT	ML	
□	silty SAND with gravel	SM	
△	silty SAND with gravel	SM	

Project No. T-8064 **Client:** D.R. Horton

Project: Barajas Property

○ **Location:** TP-6 **Depth:** 2'

□ **Location:** TP-7 **Depth:** 5'

△ **Location:** TP-9 **Depth:** 1'

Remarks:

○ Tested November 13, 2018

□ Tested November 13, 2018

△ Tested November 13, 2018

Terra Associates, Inc.

Kirkland, WA

Figure A-12

Tested By: FQ

Gibson Traffic Consultants, Inc.
2813 Rockefeller Avenue
Suite B
Everett, WA 98201
425.339.8266

Barajas
Traffic Impact Analysis

Jurisdiction: City of Monroe

November 2018

GTC #18-152

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1. DEVELOPMENT IDENTIFICATION

Gibson Traffic Consultants, Inc. (GTC) has been retained to provide a traffic impact analysis for the proposed Barajas development to address the City of Monroe, Snohomish County and Washington State Department of Transportation (WSDOT) traffic impacts. Brad Lincoln, responsible for this report and traffic analysis, is a licensed professional engineer (Civil) in the State of Washington and member of the Washington State section of ITE.

The Barajas development is proposed to consist of a total of 19 single-family residential units that will be constructed in one phase. There is 1 existing single-family residential unit that will be removed and will be credited to the development. The analysis in this report has therefore been performed for 18 new single-family residential units. The development site is located along the south side of 134th Street SE, west of 191st Avenue SE. A site vicinity map has been included in Figure 1.

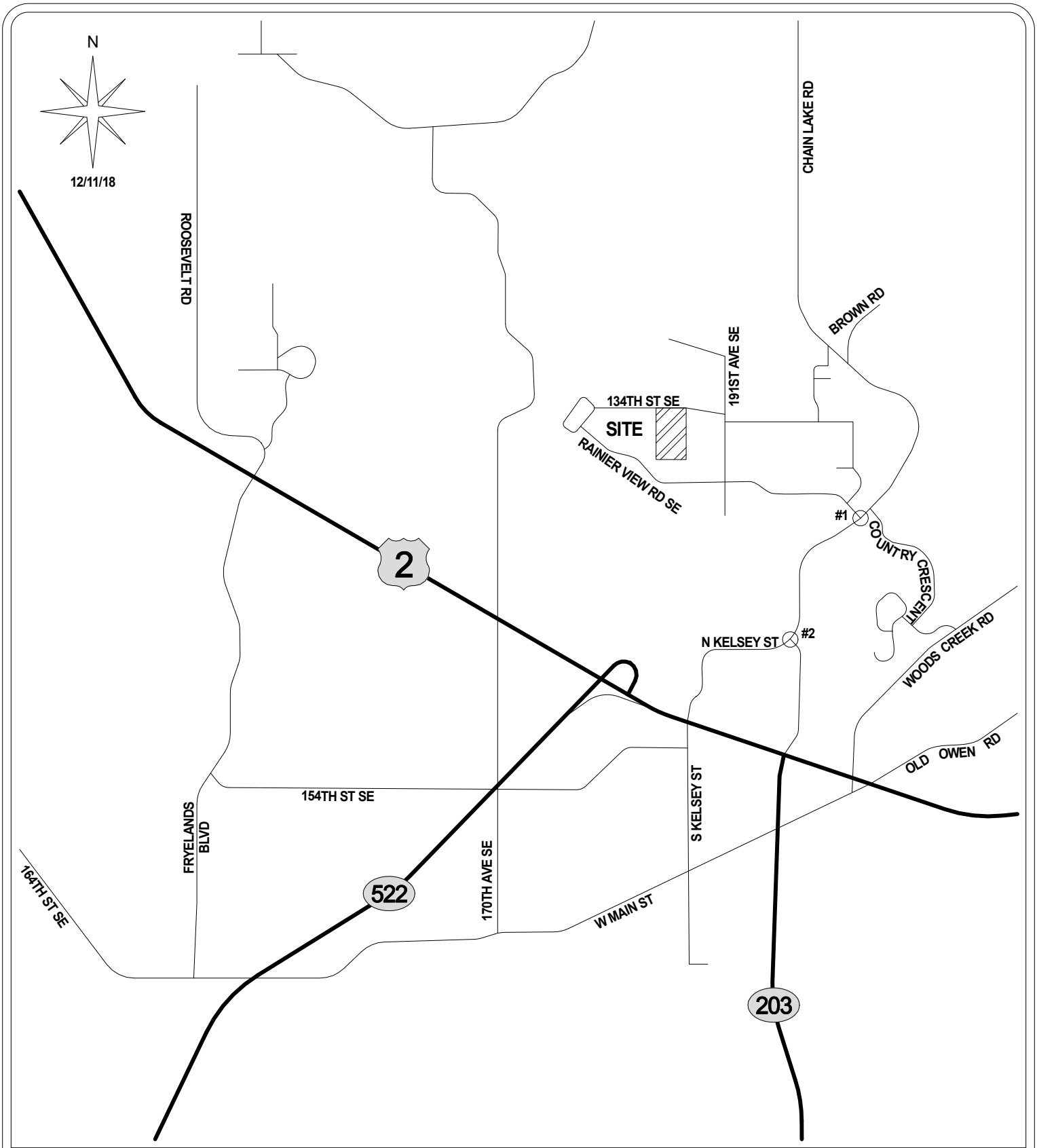
2. METHODOLOGY

Trip generation calculations for the Barajas development have been performed utilizing average trip generation data contained in the Institute of Transportation Engineers' (ITE) *Trip Generation, 10th Edition (2017)*. The distribution of trips generated by the site is based on approved distributions for developments in the site vicinity.

Intersection level of service analysis has been performed based on typical City of Monroe requirements and previous scoping conversations with City of Monroe staff. Level of service analysis has been performed for the following City of Monroe intersections:

1. Chain Lake Road at Rainier View Road SE
2. Chain Lake Road at Kelsey Street

Congestion at intersections is generally measured in terms of level of service (LOS). In accordance with *Highway Capacity Manual: 6th Edition (HCM)* by the Transportation Research Board, road facilities and intersections are rated between LOS A and LOS F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. The level of service at signalized, roundabout and all-way stop-controlled intersections is based on the average delay of all approaches. The level of service for two-way stop-controlled intersections is based on average delays for the stopped approach with the highest delay. Geometric characteristics and conflicting traffic movements are taken into consideration when determining level of service values. A summary of the intersection level of service criteria is included in Table 1.



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GTC #18-319

BARAJAS DEVELOPMENT
18 NET NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

LEGEND

DEVELOPMENT SITE

#X STUDY INTERSECTION

FIGURE 1

SITE VICINITY MAP

Table 1: Level of Service Criteria for Intersections

Level of Service[1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	Signalized Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

The City of Monroe has a level of service threshold of LOS D for arterial road intersections, which includes both of the City of Monroe study intersections. The level of service analysis has been performed utilizing the *Synchro 10.2 Build 0* software for the intersection of Chain Lake Road at (intersection 1). The *Sidra 8.0* software has been utilized for the intersection of Chain Lake Road at Kelsey Street (intersection 2), which is a roundabout.

The City of Monroe also has an interlocal agreement with Snohomish County to provide turning movements at Snohomish County key intersections impacted with 3 or more directional peak-hour trips on any approach or departure and for traffic mitigation fees.

[1] **Source:** *Highway Capacity Manual 6th Edition.*

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LOS B: Generally stable traffic flow conditions.
LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

3. TRIP GENERATION

The trip generation calculations for the Barajas development are based on the average trip generation rates for ITE Land Use Code 210, Single-Family Detached Housing. The trip generation calculations are based on the 30 new units of the Barajas development, which includes credit for the existing unit on the site and are summarized in Table 2.

Table 2: Trip Generation Summary

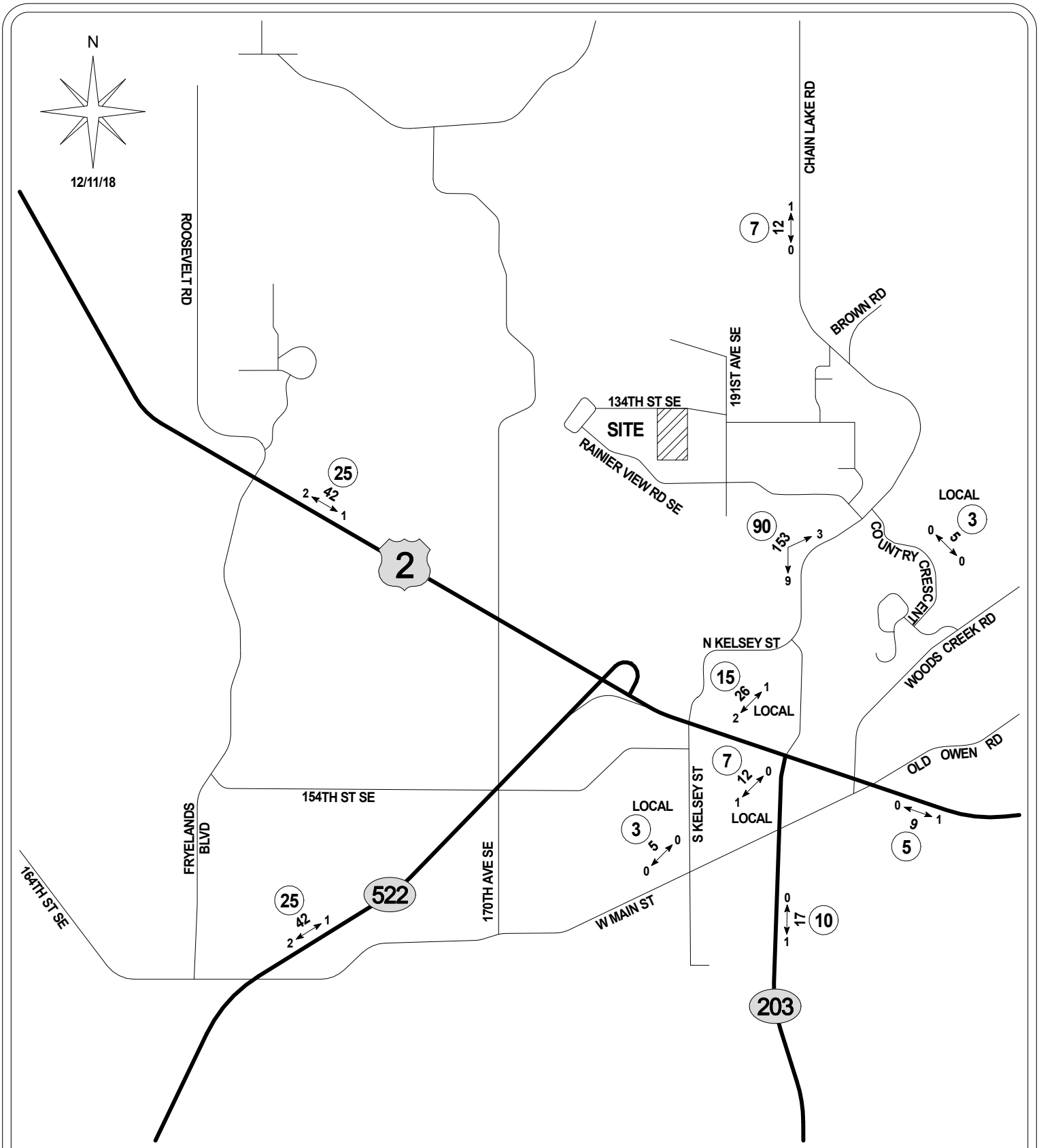
18 New Single-Family Residential Units	Average Daily Trips			AM Peak-Hour Trips			PM Peak-Hour Trips		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
Generation Rate	9.44 trips per unit			0.74 trips per unit			0.99 trips per unit		
Splits	50%	50%	100%	25%	75%	100%	63%	37%	100%
Trips	84.96	84.96	169.92	3.33	9.99	13.32	11.23	6.59	17.82

The 18 new units are anticipated to generate approximately 169.92 average daily trips with approximately 13.32 AM peak-hour trips and 17.82 PM peak-hour trips.

4. TRIP DISTRIBUTION

The distribution of trips generated by the Barajas development is based on approved distributions for developments in the site vicinity. It is anticipated that 25% of the development's trips will travel to and from the west along US-2. Approximately 35% of the development's trips will travel to and from the south, twenty-five percent along SR-522 and ten percent along SR-203. It is estimated that 28% of the development's trips will travel to and from local areas in the vicinity of the development, ten percent south of US-2, fifteen percent north of US-2, and three percent to the east. The remaining 12% of the development's trips are anticipated to travel to and from the north and east, seven percent to and from the north along Chain Lake Road and five percent to and from the east along US-2. Detailed distributions are included in Figure 2 for the AM peak-hour and Figure 3 for the PM peak-hour.

The interlocal agreement with Snohomish County requires key intersections impacted with 3 or more directional peak-hour trips on any approach or departure to be shown. The Barajas development will impact 3 key intersections during the PM peak-hour. The key intersection impacts are shown in detail in the attachments of this report. Snohomish County's trip distribution policy states that trips along US-2 do not need to be distributed west of 88th Street SE. Trips traveling to and from the south along SR-522 and SR-203 are anticipated to travel to and from King County.



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BARAJAS DEVELOPMENT
18 NET NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

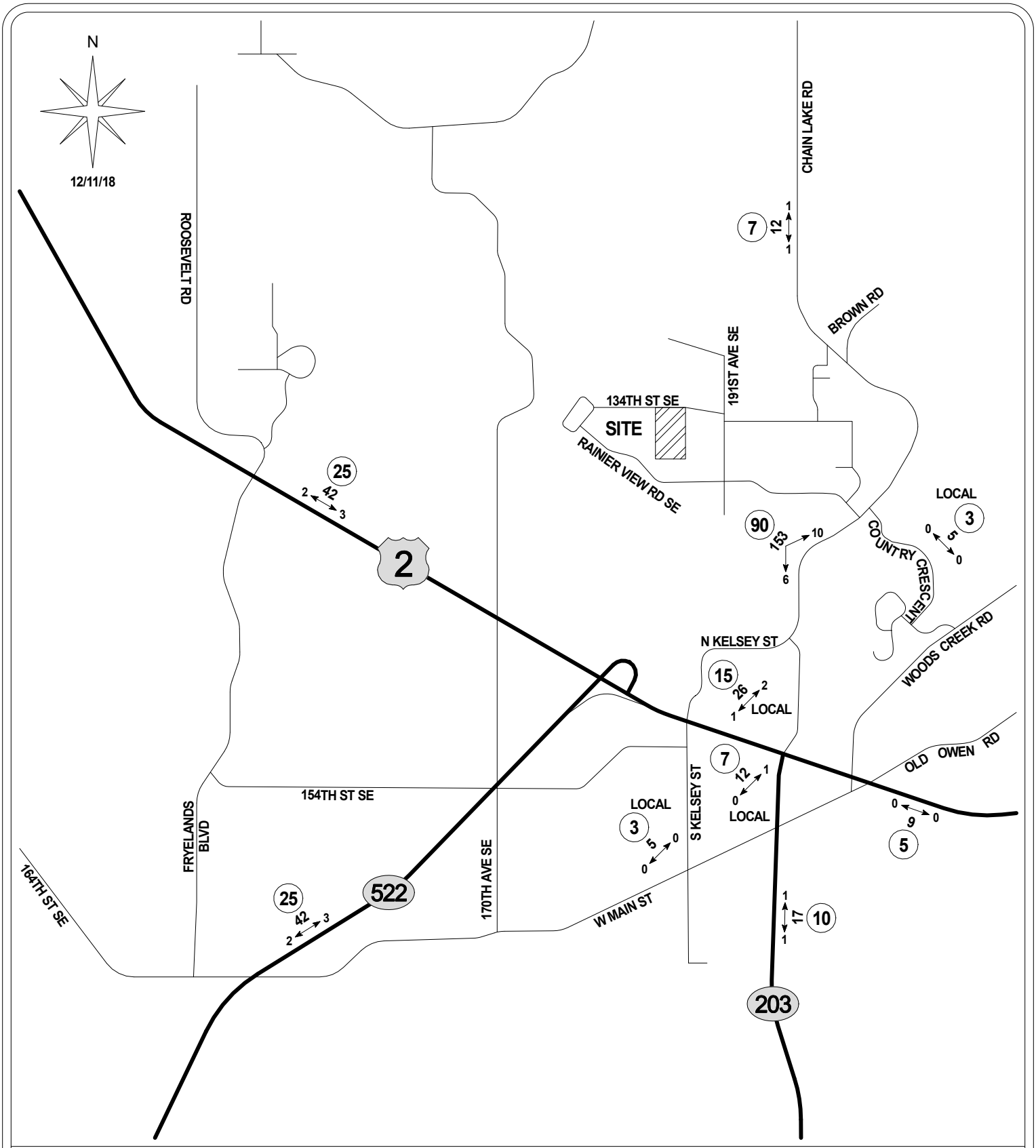
LEGEND

AWDT
AM ⟷ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 2

DEVELOPMENT TRIP DISTRIBUTION AM PEAK-HOUR



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CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3

DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR

5. INTERSECTION LEVEL OF SERVICE ANALYSIS

The intersections that have been analyzed as part of this report are based on the typical City of Monroe requirements and previous scoping discussions with City of Monroe staff. Level of service analysis has been performed for the following intersections for the weekday PM peak-hour:

1. Chain Lake Road at Rainier View Road SE
2. Chain Lake Road at Kelsey Street

The analysis has been completed for the existing, 2028 baseline and 2028 future with development conditions.

5.1 Turning Movement Volumes

The existing turning movements at the study intersections are based on data collected by the independent count firm, Traffic Data Gathering (TDG), in January 2018. The existing turning movements at the study intersections are shown in Figure 4.

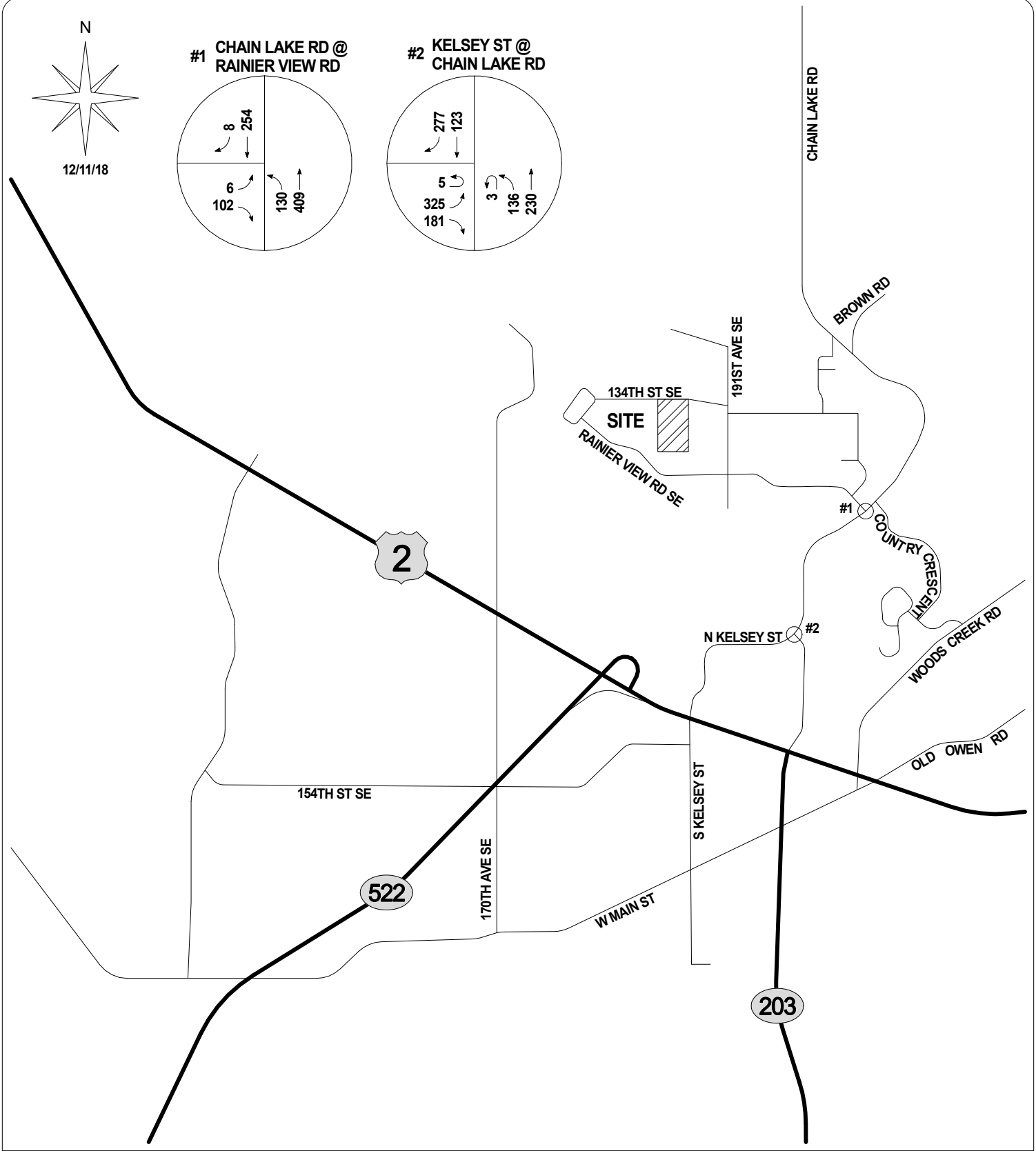
The 2028 baseline volumes have been calculated using a 10-year horizon period and applying a 2% annually compounding growth rate with the following pipeline developments:

- Eaglemont I-III (F.K.A. Eaglemont) – 15 unconstructed new single-family units
- Eaglemont IV (F.K.A. Eaglemont IV-VIII) – 117 new single-family units
- Eaglemont V – 15 new single-family units
- Eaglemont VI (F.K.A. Sky View Ridge) – 44 new single-family units
- Eaglemont VII – 41 new single-family units
- Easton Cove (F.K.A. Klier Property) – 88 new single-family units
- Worthington Heights – 100 new single-family units
- Raspberry Hill – 25 new single-family units
- Clothier Short Plat – 6 new single-family units
- 2 Short Plats north of Easton Cove – 10 new single-family units
- Kestrel Ridge – 30 new single-family units

The approved PM peak-hour trip distributions for the pipeline developments are included in the attachments. For the pipeline projects where a trip distribution was not available, the pipeline's trips were distributed in accordance with the Barajas distribution. The Eaglemont I-III development is anticipated to have a total of 149 units, however, GTC staff surveyed the area and found 134 completed and lived in houses, resulting in 15 unconstructed houses for the Eaglemont I-III development. The 2028 baseline turning movements at the study intersections are shown in Figure 5.

The 2028 future with development turning movements were calculated by adding the development's turning movements to the 2028 baseline turning movements. The 2028 future with development turning movements are shown in Figure 6.

The existing turning movement counts and turning movement calculations are included in the attachments.



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BARAJAS DEVELOPMENT
18 NET NEW SINGLE FAMILY DWELLINGS

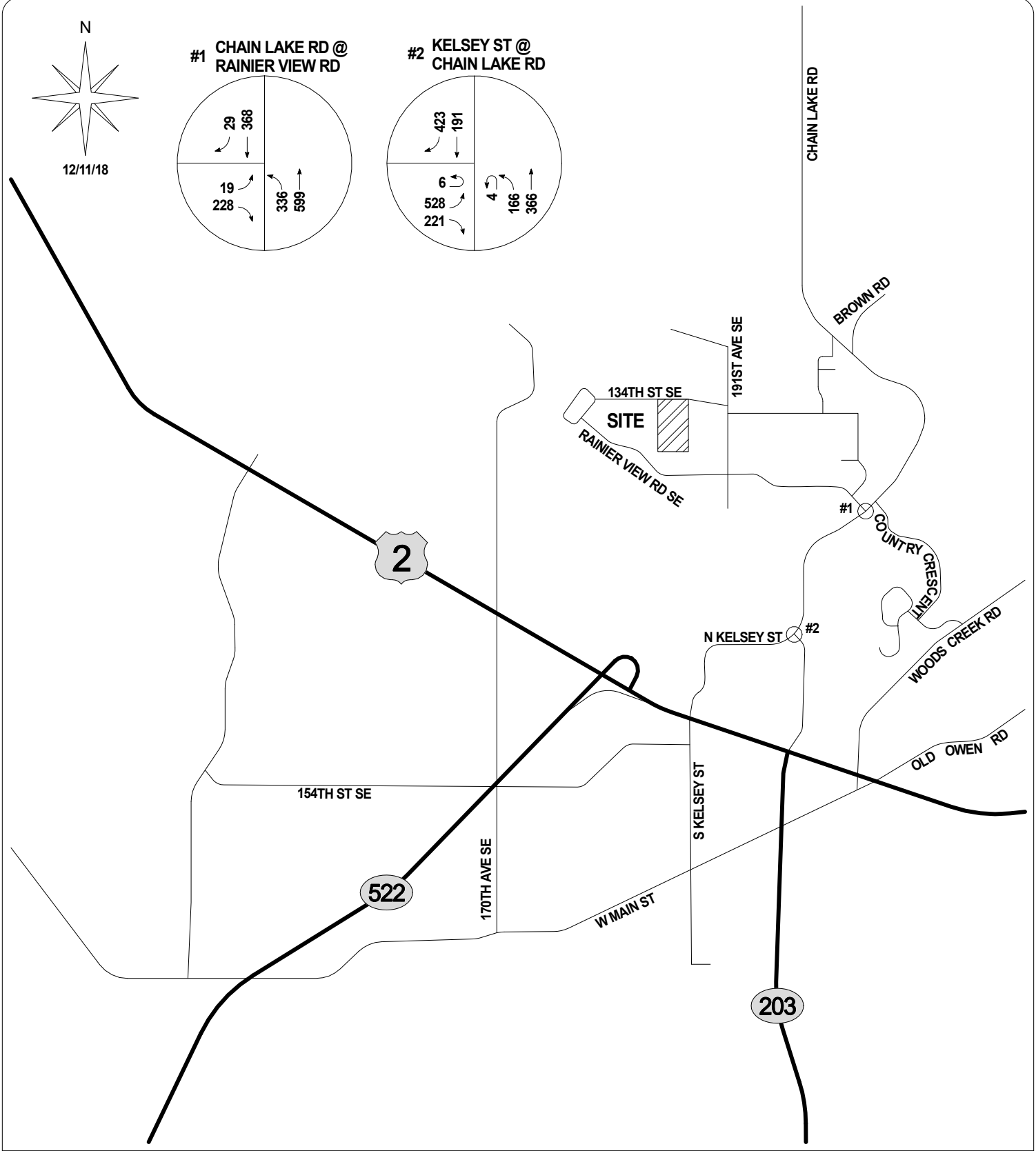
CITY OF MONROE

LEGEND

XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 4

EXISTING TURNING MOVEMENTS



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BARAJAS DEVELOPMENT
18 NET NEW SINGLE FAMILY DWELLINGS

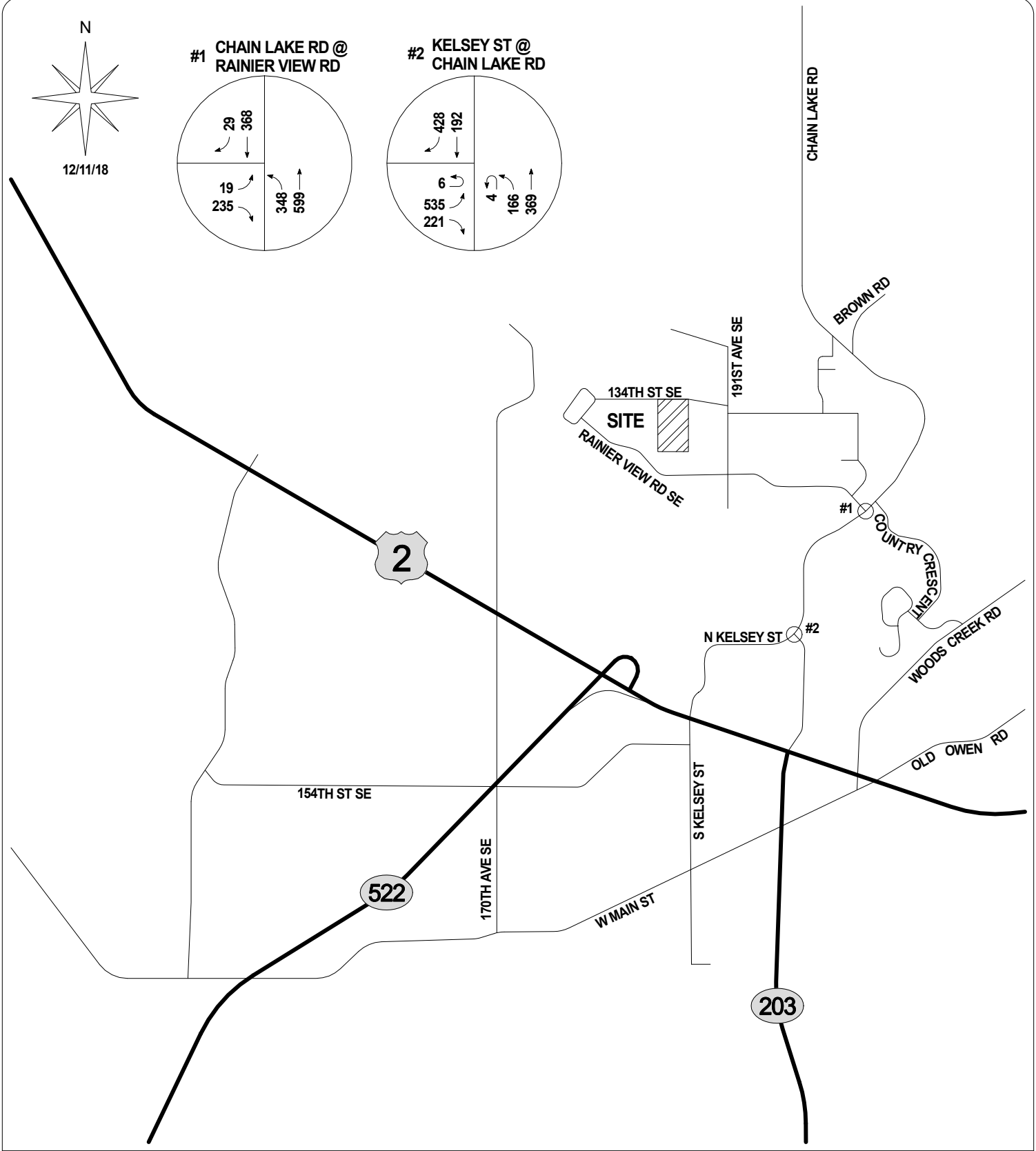
CITY OF MONROE

LEGEND

XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 5

2028 BASELINE TURNING MOVEMENTS



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18 NET NEW SINGLE FAMILY DWELLINGS

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XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 6

2028 FUTURE WITH DEVELOPMENT TURNING MOVEMENTS

5.2 Intersection Level of Service Results

The level of service analysis has been performed utilizing the existing control, channelization, peak-hour factors and heavy-vehicle factors from the 2018 counts.

The level of service analysis shows that the development will not cause any intersection to operate at LOS F and will not cause the level of service to change from the 2028 baseline conditions. However, the intersection of Chain Lake Road at Rainier View Road SW is anticipated to operate at LOS E under the 2028 baseline and 2028 future with development conditions. The level of service results for the study intersections are summarized in Table 3.

Table 3: Intersection Level of Service Summary

Intersection	Intersection Type	2018 Existing Conditions		2028 Baseline Conditions		2028 Future Conditions with Development	
		LOS	Delay	LOS	Delay	LOS	Delay
1. Chain Lake Road at Rainier View Road SW	Two-Way Stop-Control	B	11.6 sec	E	45.9 sec	E	49.2 sec
2. Chain Lake Road at Kelsey Street	Roundabout	A	7.3 sec	A	9.8 sec	B	10.0 sec

The level of service calculations are included in the attachments.

5.2.1. Chain Lake Road at Rainier View Road

Improvements to the Chain Lake Road corridor have been analyzed as part of the updated City of Monroe Comprehensive Plan. Improvements to Chain Lake Road to increase vehicle capacity are included in the Comprehensive Plan and show the intersection of Chain Lake Road at Rainier View Road operating at LOS C. The City of Monroe traffic mitigation fees, which are discussed later in this report, will help fund these improvements.

6. TRAFFIC MITIGATION FEES

The Washington Growth Management Act and Revised Code of Washington 82.02.050(2) authorize local jurisdictions to establish proportionate share traffic mitigation fees in order to fund capital facilities, such as roads and intersections. The Barajas development is located within the City of Monroe, which has established traffic mitigation fees. The City of Monroe also has interlocal agreements with Snohomish County and WSDOT for traffic mitigation fees.

6.1 City of Monroe

The City of Monroe has established a traffic mitigation fee schedule. The fee for single-family residential units is $3,475 per unit. The 18 new units of the Barajas development will result in City of Monroe traffic mitigation fees of $62,550. It should be noted that these fees may not vest and may be higher when the building applications are pulled.

6.2 Snohomish County

The City of Monroe and Snohomish County have an interlocal agreement that provides for the payment of traffic mitigation for impacts to Snohomish County roadways by City of Monroe developments. Traffic mitigation fees are based on predetermined area impacts or impacts to actual improvement projects. The trip distribution shows that the Barajas development will not impact any Snohomish County improvement projects in the Transportation Needs Report with three directional PM peak-hour trips. According to Section 3(a)2 of the S*nohomish County Traffic Worksheet and Traffic Study Requirements for Developments in the City of Monroe*, City of Monroe developments are only required to pay traffic mitigation fees for improvements in the Transportation Needs Report impacted with three directional peak-hour trips. Snohomish County traffic mitigation fees should therefore not be required for the Barajas development.

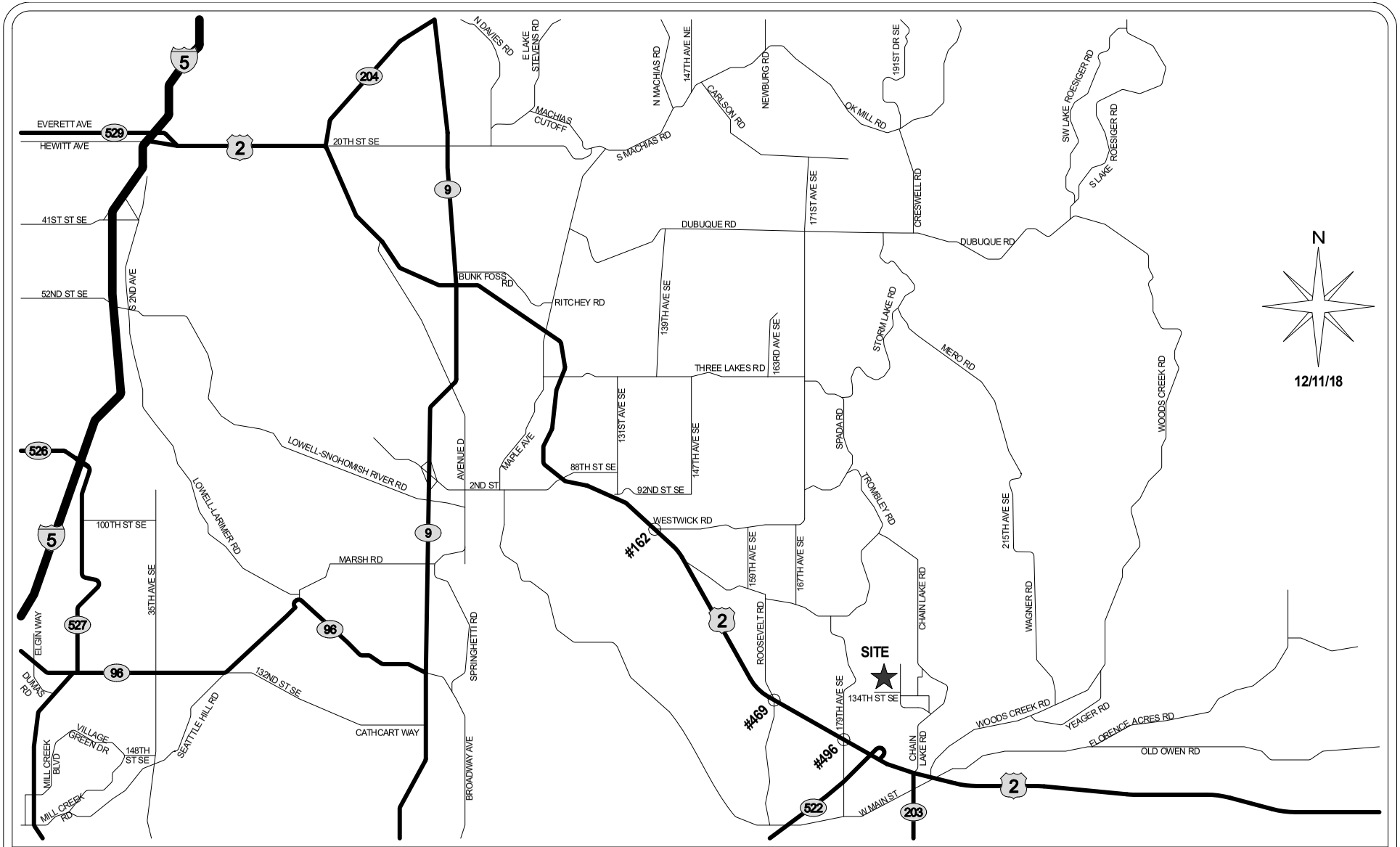
6.3 WSDOT

The City of Monroe and WSDOT have an interlocal agreement that provides for the payment of traffic mitigation fees. The interlocal agreement states that a development only has a "significant adverse impact" if the development contributes 25 or more trips to a WSDOT intersection. The Barajas development is not anticipated to impact any WSDOT intersections with 25 PM peak-hour trips and is therefore not anticipated to have a "significant adverse impact" on WSDOT intersections. WSDOT does not have a collection project for any of the intersections near the Barajas development and therefore WSDOT traffic mitigation fees should not be assessed for the Barajas development.

7. CONCLUSIONS

The Barajas development is proposed to consist of 19 single-family residential units with 1 existing unit being removed. The 18 new units of the Barajas development are anticipated to generate approximately 169.92 average daily trips with approximately 13.32 AM peak-hour trips and 17.82 PM peak-hour trips. The level of service analysis shows that all the study intersections are anticipated to operate at acceptable levels of service except for Chain Lake Road at Rainier View Road SW, which will operate at LOS E in the 2028 baseline and future with development conditions. The intersection is planned for capacity improvements identified in the latest Comprehensive Plan. The Barajas development will have City of Monroe traffic mitigation fees of $62,550. The development's impacts will not meet the thresholds for paying traffic mitigation fees to Snohomish County or WSDOT.

Snohomish County Key Intersection Impacts



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BARAJAS DEVELOPMENT
21 NET NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

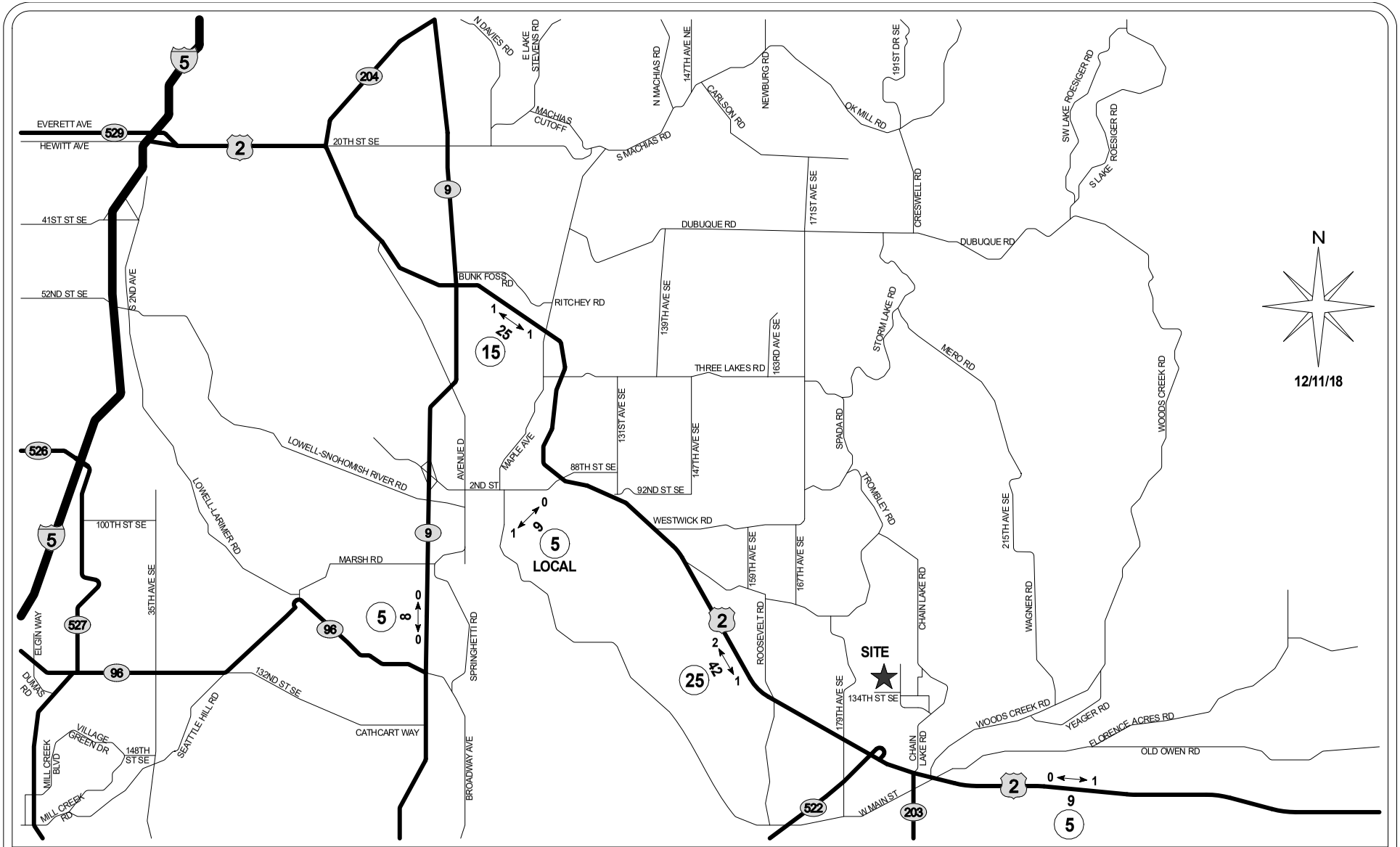
LEGEND

★ DEVELOPMENT SITE

⊕ ### KEY INTERSECTION

FIGURE A1

KEY INTERSECTION LOCATIONS



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BARAJAS DEVELOPMENT
21 NET NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

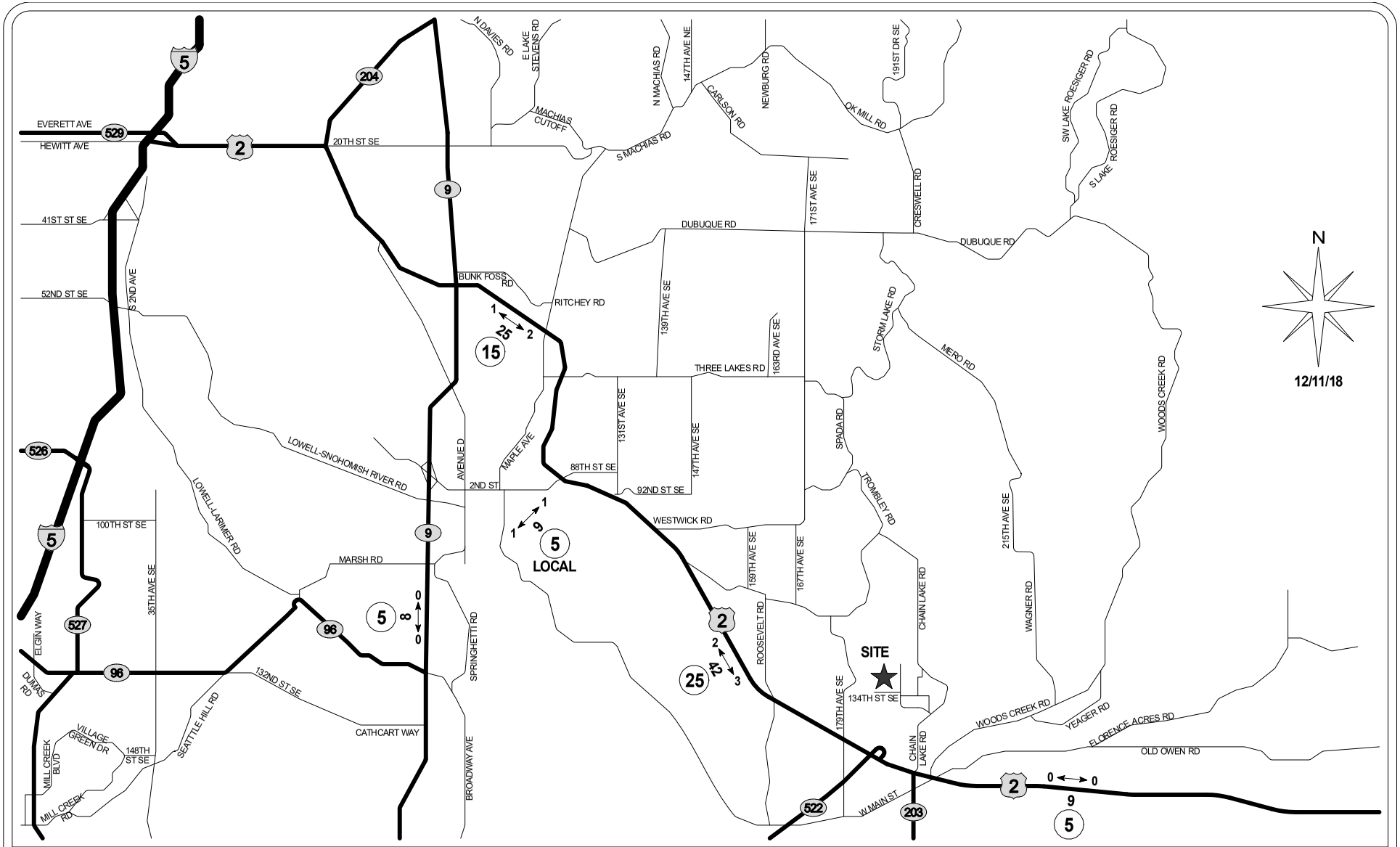
LEGEND

AWDT
AM ◄► PEAK — NEW SITE TRAFFIC DAILY AND AM PEAK-HOUR

XX — TRIP DISTRIBUTION %

FIGURE A2

DEVELOPMENT TRIP DISTRIBUTION AM PEAK-HOUR



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21 NET NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

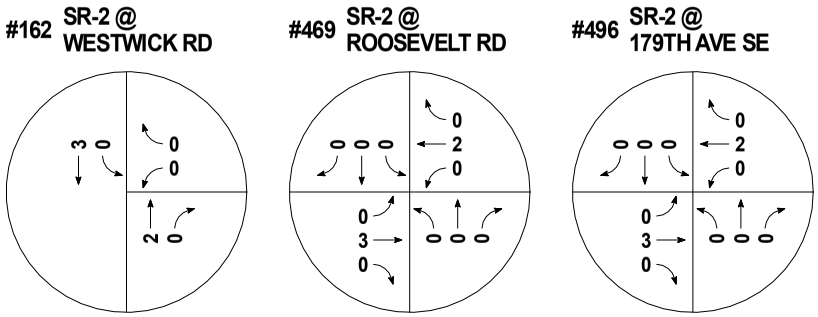
LEGEND

AWDT
PM ◄► PEAK — NEW SITE TRAFFIC DAILY AND PM PEAK-HOUR

XX — TRIP DISTRIBUTION %

FIGURE A3

DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



PM
PEAK-HOUR

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21 NET NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

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XXX→ PEAK HOUR TURNING MOVEMENT VOLUME

FIGURE A4

DEVELOPMENT
KEY INTERSECTION VOLUMES
PM PEAK-HOURS

PM Peak-Hour Key Intersection Volumes

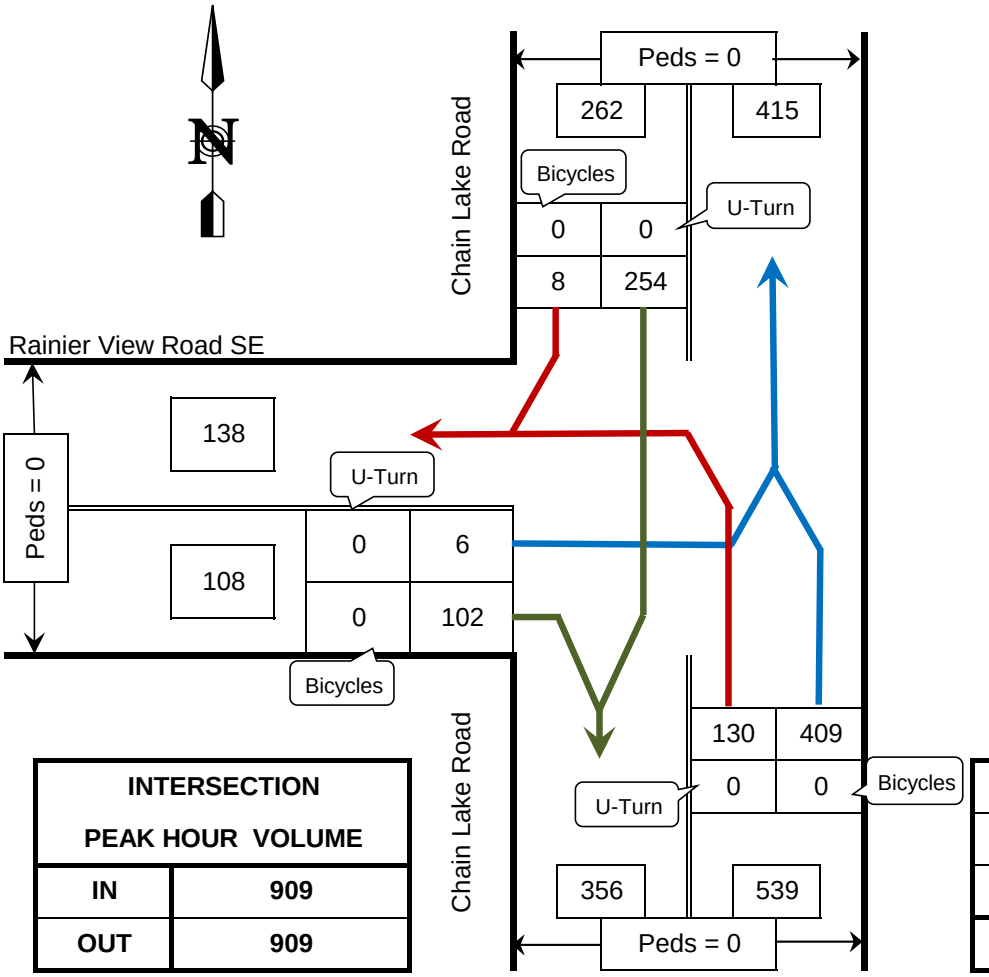
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#162: SR-2 at Westwick Rd	N/A	N/A	N/A	0	N/A	0	N/A	2	0	0	3	N/A
#469: SR-2 at Roosevelt Rd	0	3	0	0	2	0	0	0	0	0	0	0
#496: SR-2 at 179th Ave SE	0	3	0	0	2	0	0	0	0	0	0	0

Turning Movement Calculations and Counts

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 PM - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM



INTERSECTION PEAK HOUR VOLUME	
IN	909
OUT	909

	HV	PHF
SB	2.3%	0.89
NB	1.1%	0.89
EB	0.9%	0.90
INTRS.	1.4%	0.91

HV = Heavy Vehicles
PHF = Peak Hour Factor

Chain Lake Road @ Rainier View Road SE

Monroe, WA

COUNTED BY: VT/CN

REDUCED BY: CN

REDUCTION DATE: Tue. 2/6/18

DATE OF COUNT: Wed. 1/31/18

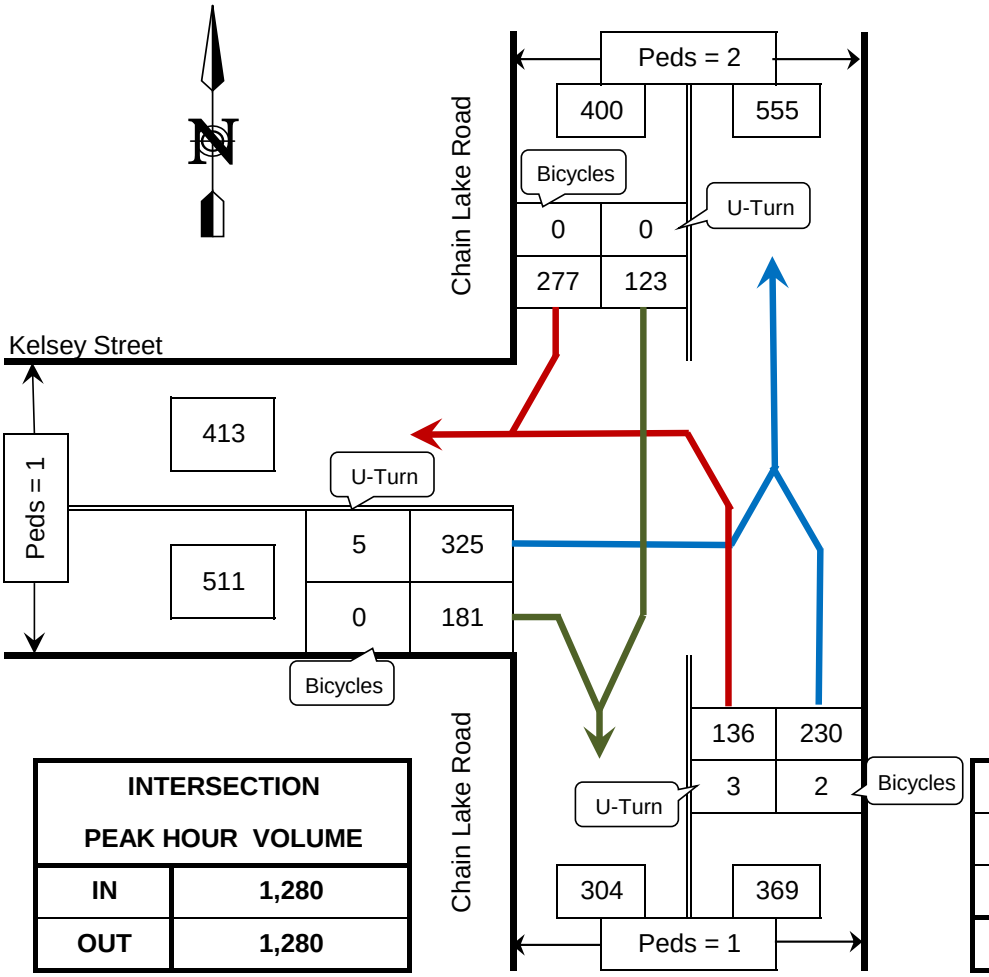
TIME OF COUNT: 4:00 PM - 6:00 PM

WEATHER: Rainy

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 PM - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM



INTERSECTION PEAK HOUR VOLUME	
IN	1,280
OUT	1,280

	HV	PHF
SB	2.8%	0.88
NB	4.6%	0.92
EB	2.0%	0.90
INTRS.	3.0%	0.93

HV = Heavy Vehicles
PHF = Peak Hour Factor

Chain Lake Road @ Kelsey Street

Monroe, WA

COUNTED BY: VT

REDUCED BY: CN

REDUCTION DATE: Fri. 3/9/18

DATE OF COUNT: Wed. 3/7/18

TIME OF COUNT: 4:00 PM - 6:00 PM

WEATHER: Overcast

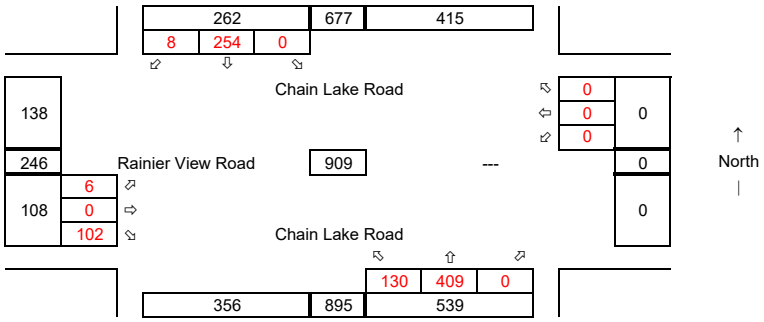
1 Rainier View @ Chain Lake Rd

Synchro ID: 1

Existing
Average Weekday
PM Peak Hour

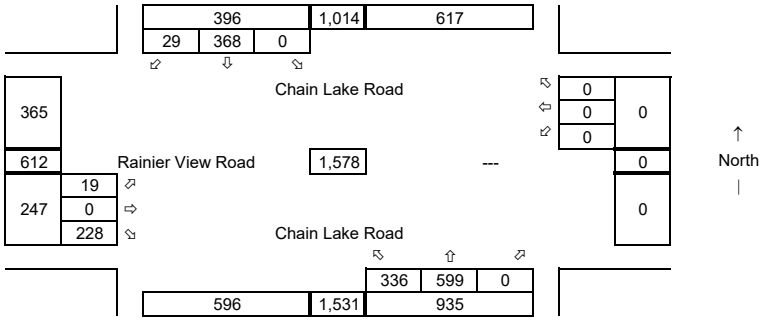
Year: **1/31/18**

Data Source: **TDG**

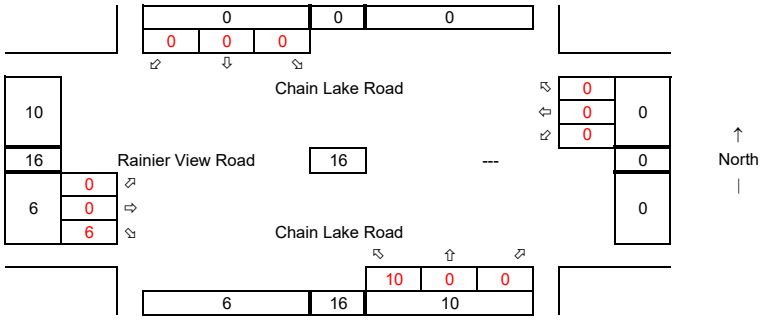


Future without Project
Average Weekday
PM Peak Hour

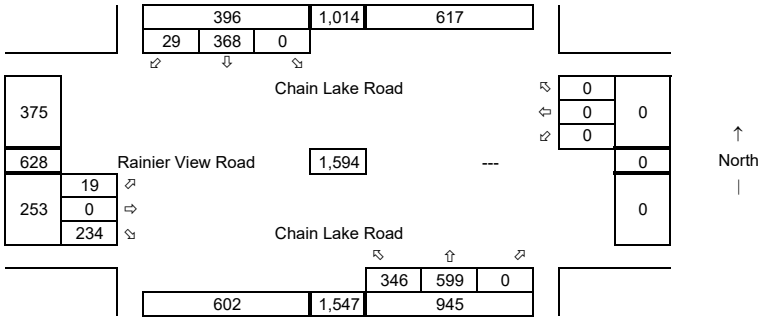
Year: 2028
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.2190



Total Project Trips
Average Weekday
PM Peak Hour

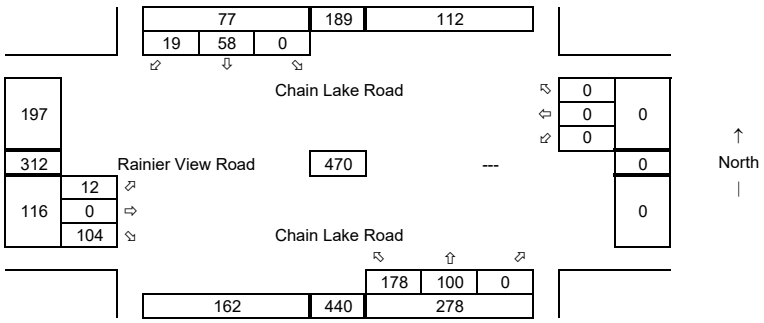


Future with Project
Average Weekday
PM Peak Hour



Pipeline Trips
Average Weekday
PM Peak Hour

Eaglemont 1-7
Easton Cove
Worthington Heights
Raspberry Hill
Clothier Short Plat
2 Short Plats
Kestrel Ridge



---

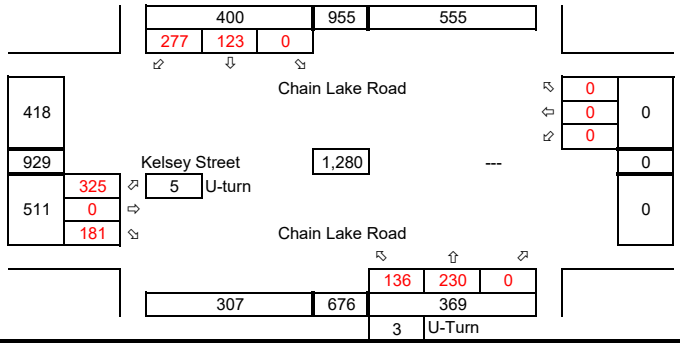
2 Kelsey St @ Chain Lake Rd

Synchro ID: 2

Existing
Average Weekday
PM Peak Hour

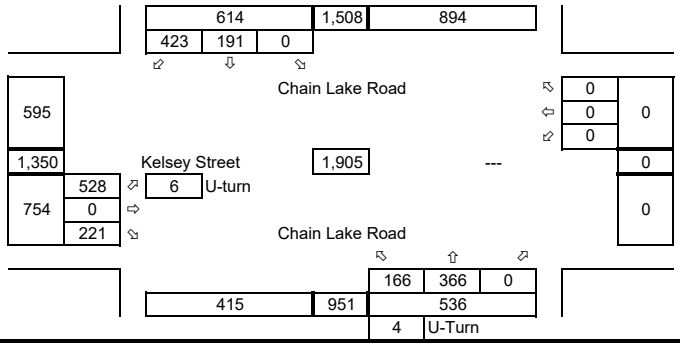
Year: **1/31/18**

Data Source: **TDG**

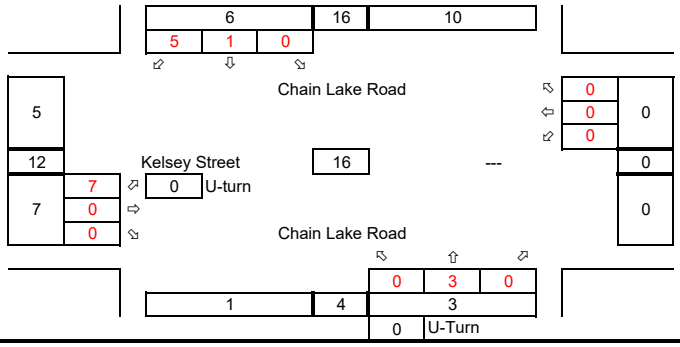


Future without Project
Average Weekday
PM Peak Hour

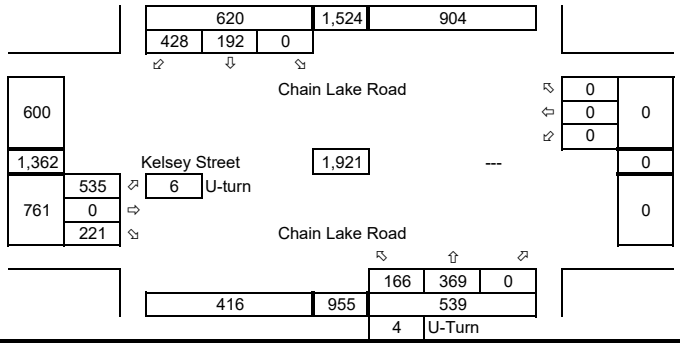
Year: 2028
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.218994



Total Project Trips
Average Weekday
PM Peak Hour

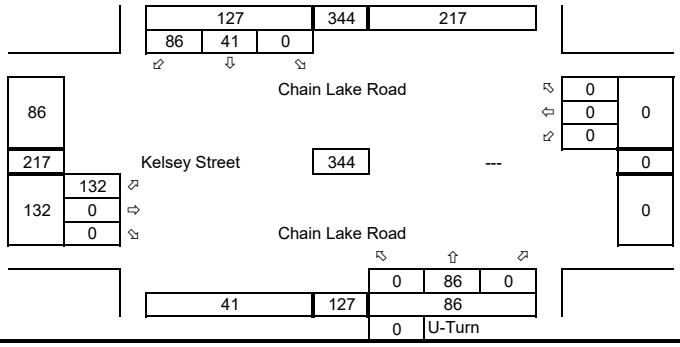


Future with Project
Average Weekday
PM Peak Hour

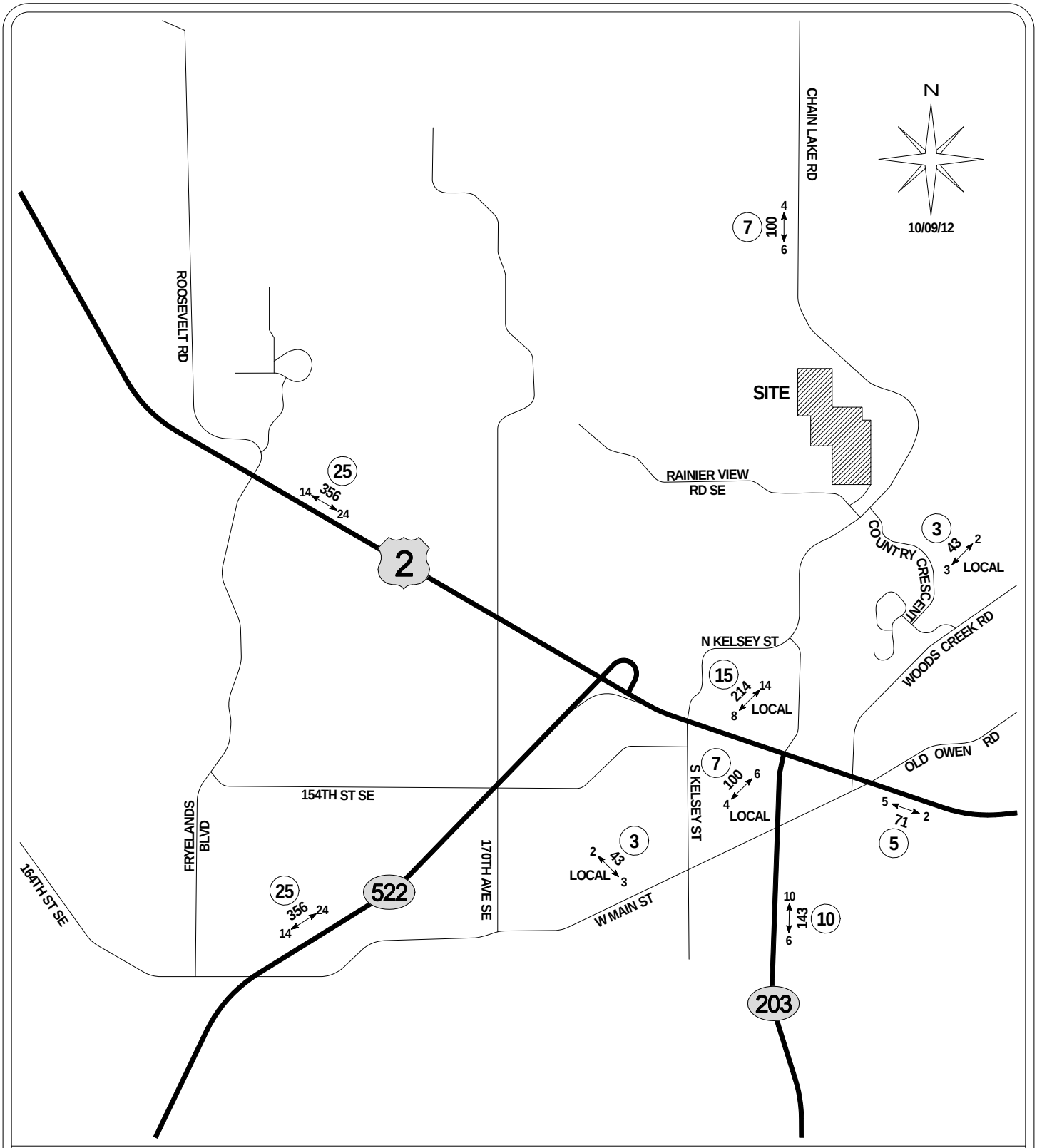


Pipeline Trips
Average Weekday
PM Peak Hour

Eaglemont 1-7
Easton Cove
Worthington Heights
Raspberry Hill
Clothier Short Plat
2 Short Plats
Kestrel Ridge



Pipeline Information



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #12-087

EAGLEMONT
149 SINGLE-FAMILY UNITS

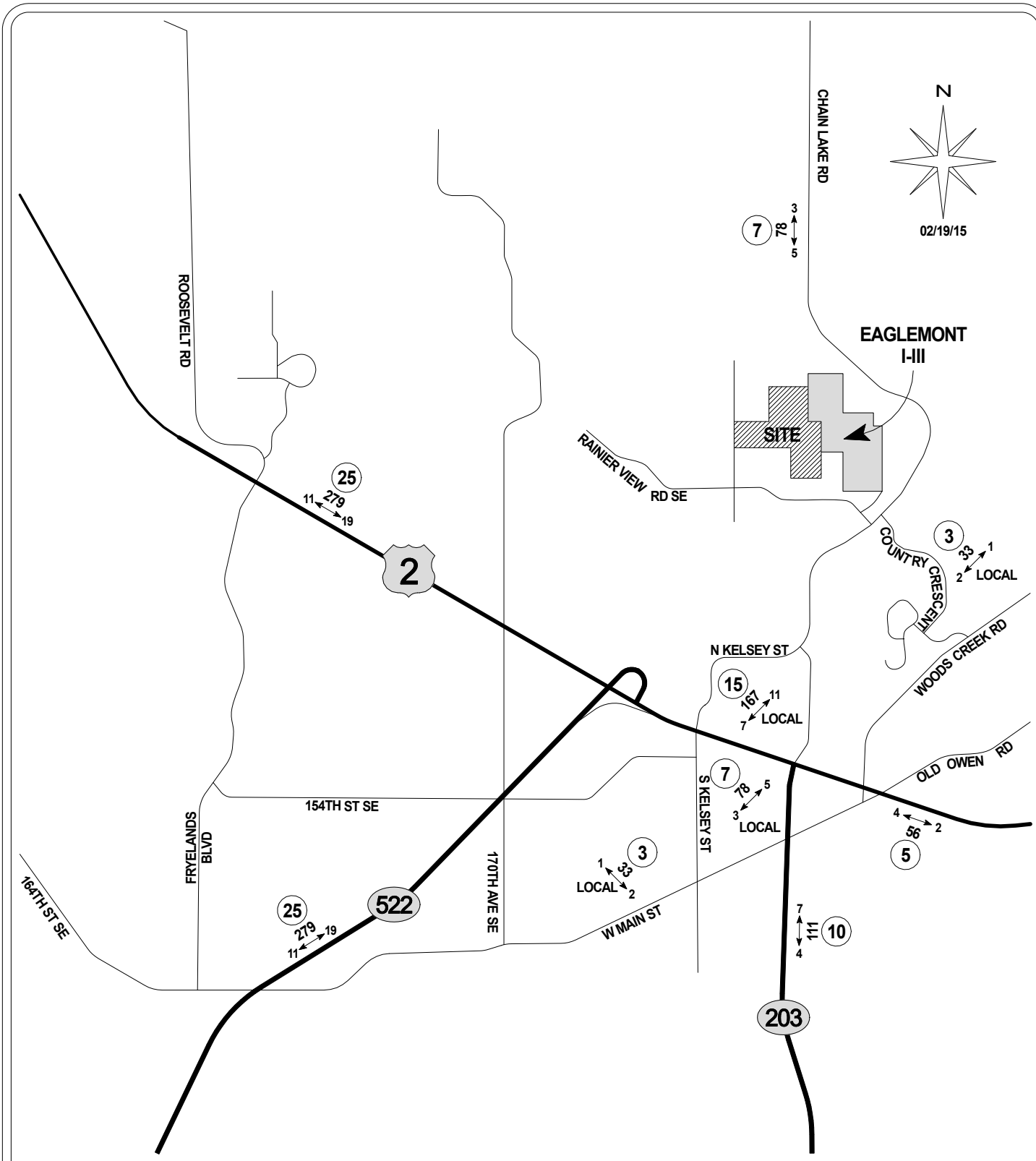
CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

25 — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #15-045

EAGLEMONT IV-VIII
117 NEW SINGLE-FAMILY UNITS

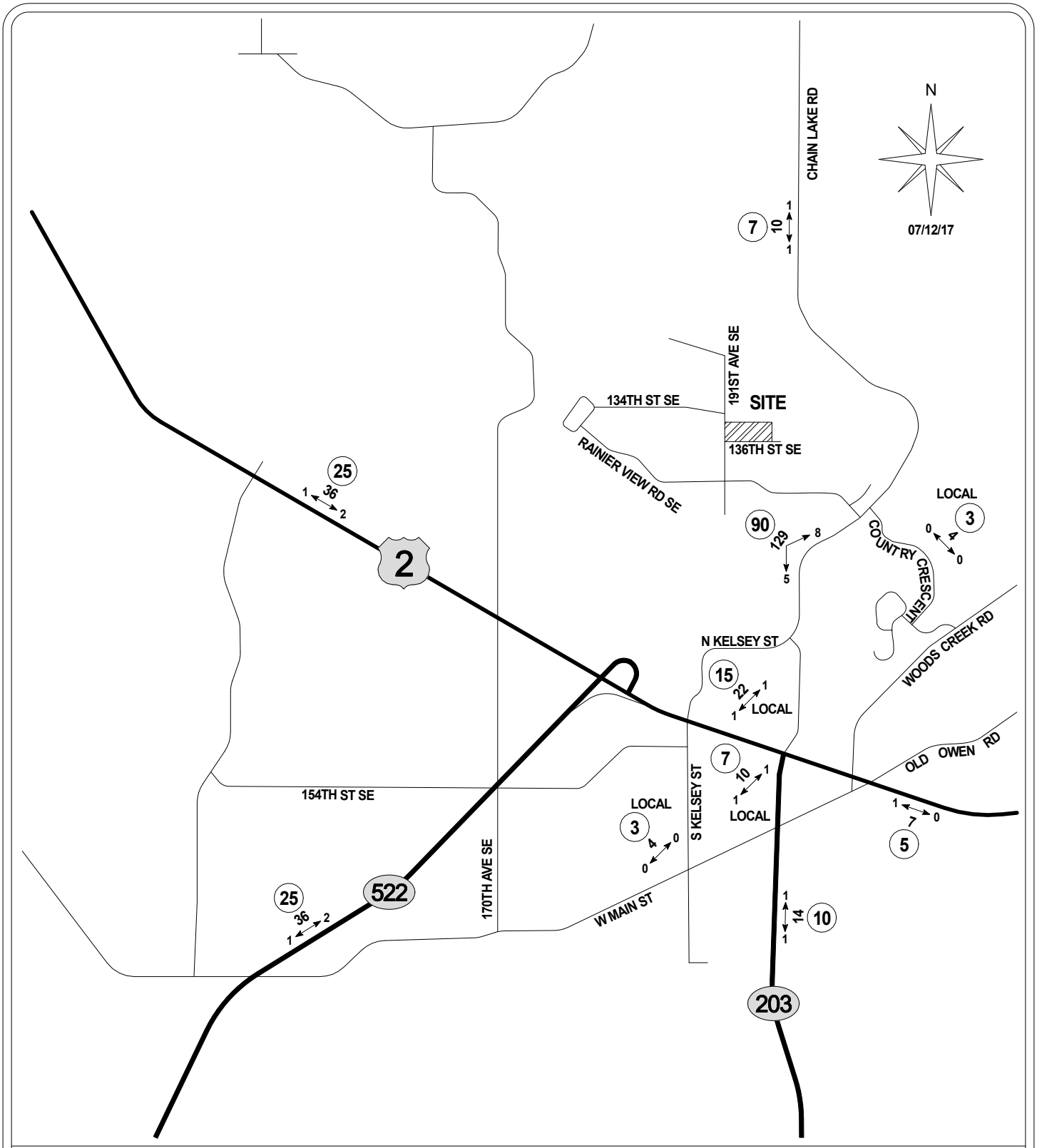
CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #17-130

EAGLEMONT 5
15 NEW SINGLE FAMILY DWELLINGS

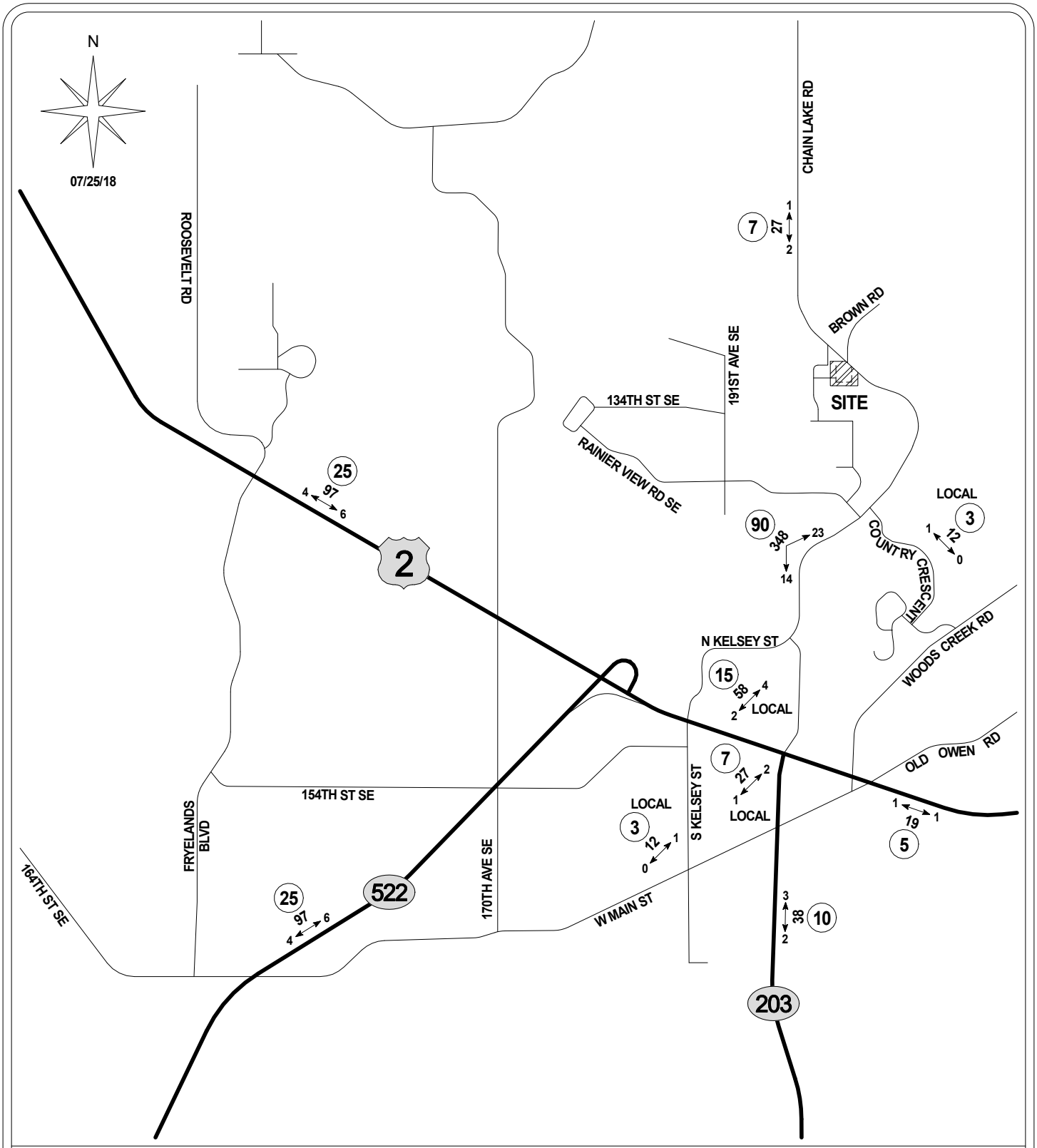
CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #18-042

EAGLEMONT 7
41 NEW SINGLE FAMILY DWELLINGS

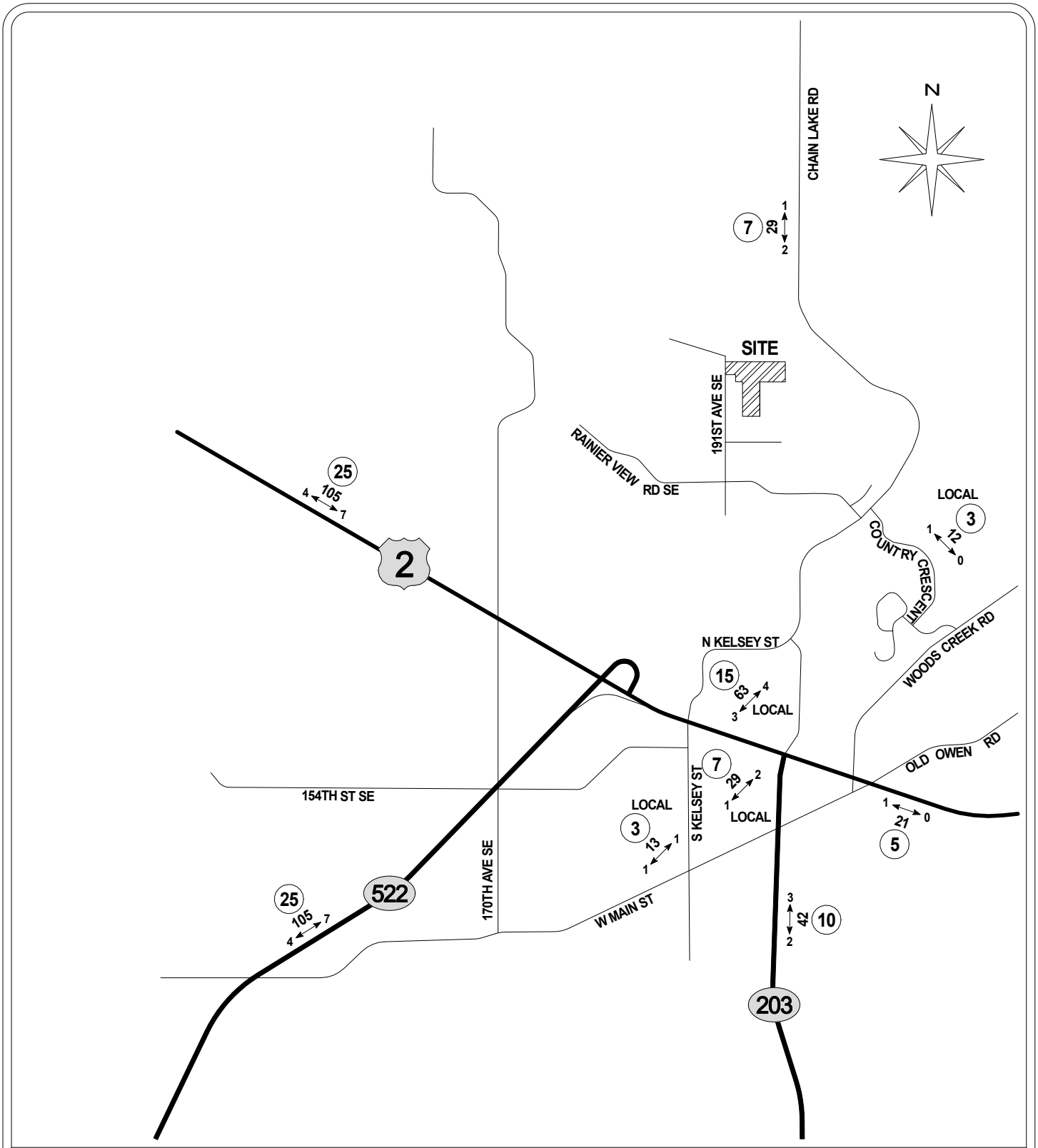
CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #15-244

SKY VIEW RIDGE
44 NEW SINGLE-FAMILY UNITS

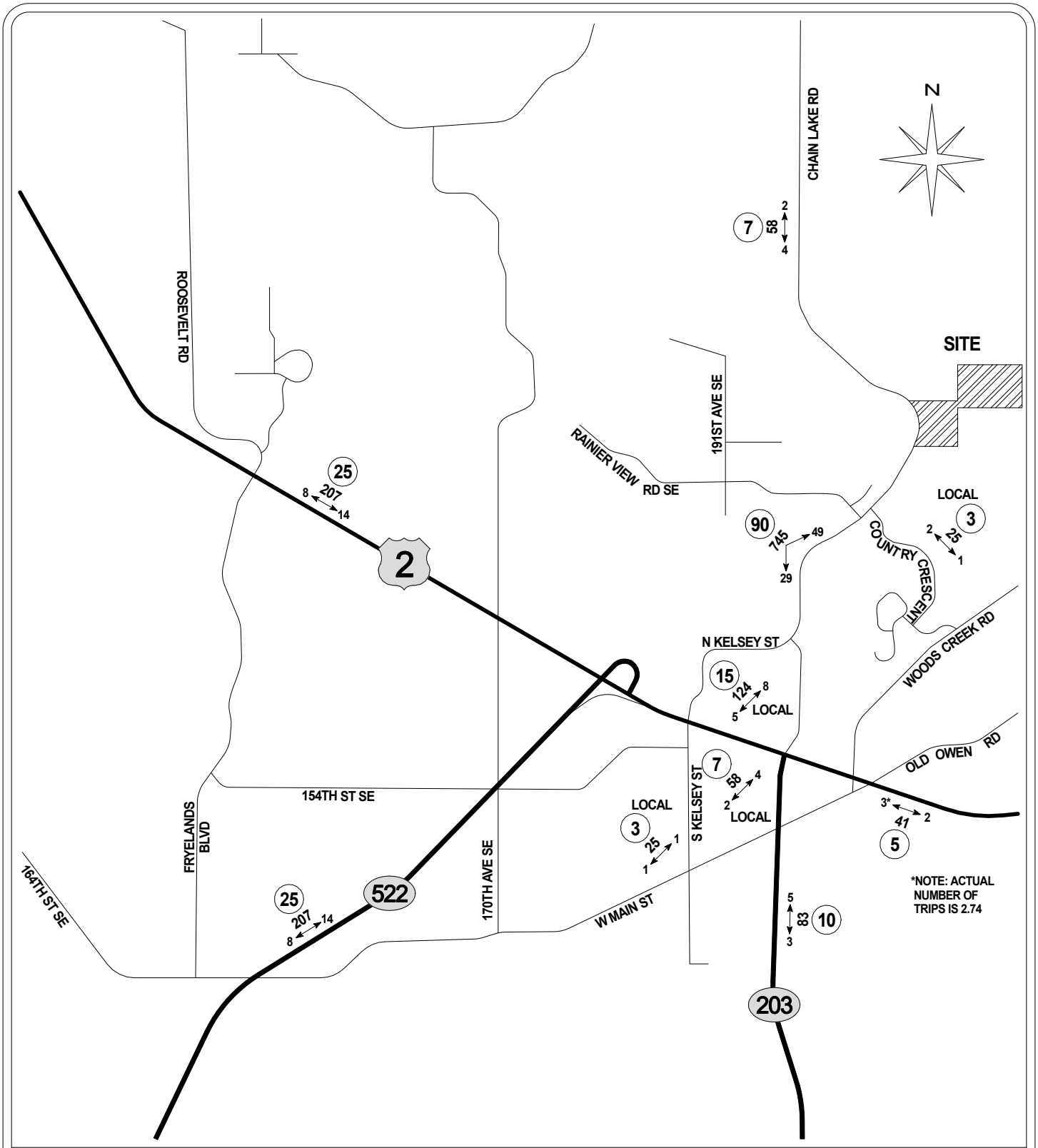
CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 2
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-030

KLIER DEVELOPMENT
87 NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

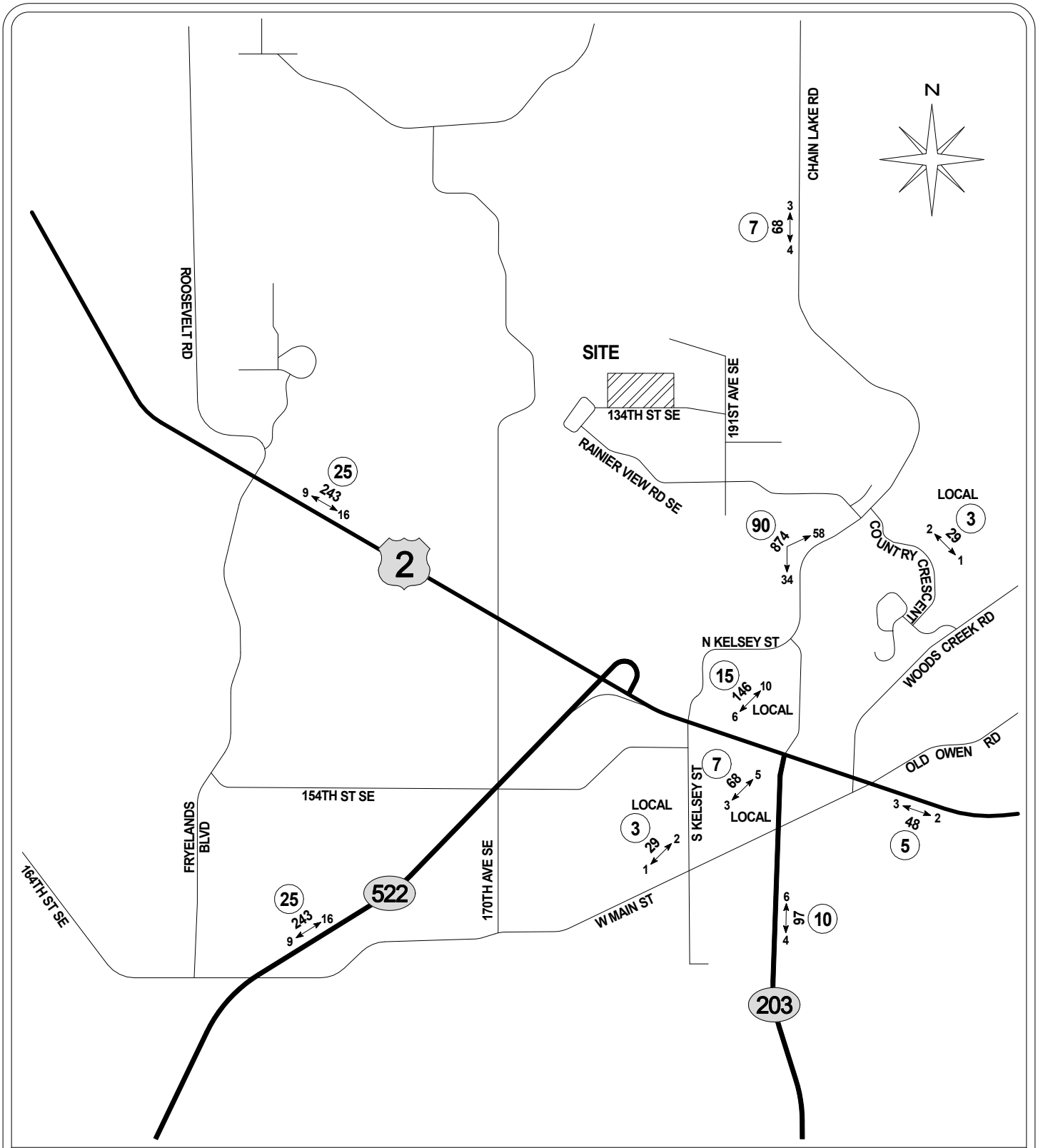
LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3

DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-171

WORTHINGTON HEIGHTS
106 SINGLE FAMILY DWELLINGS

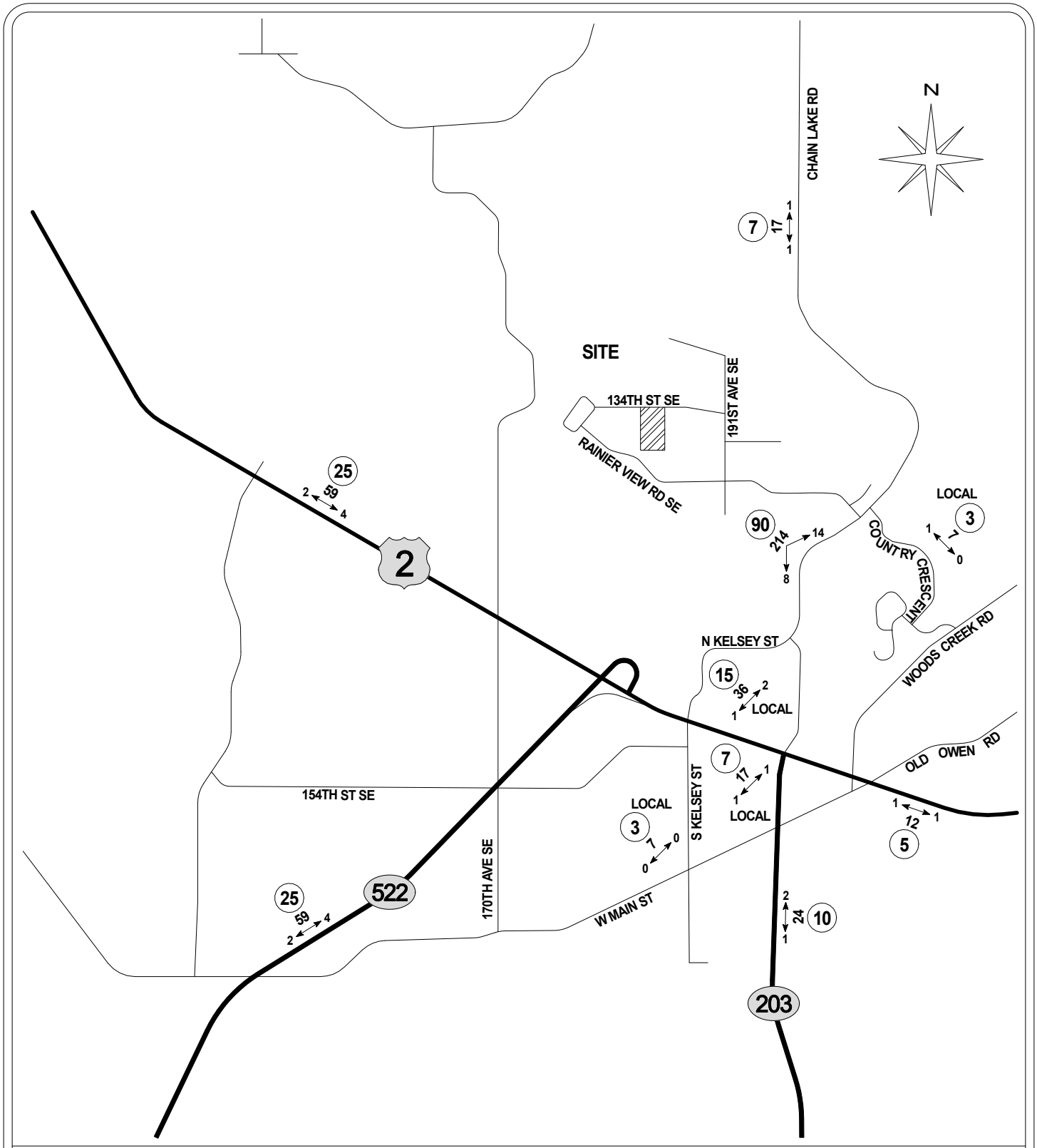
CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-165

RASPBERRY HILL
25 NEW SINGLE FAMILY DWELLINGS

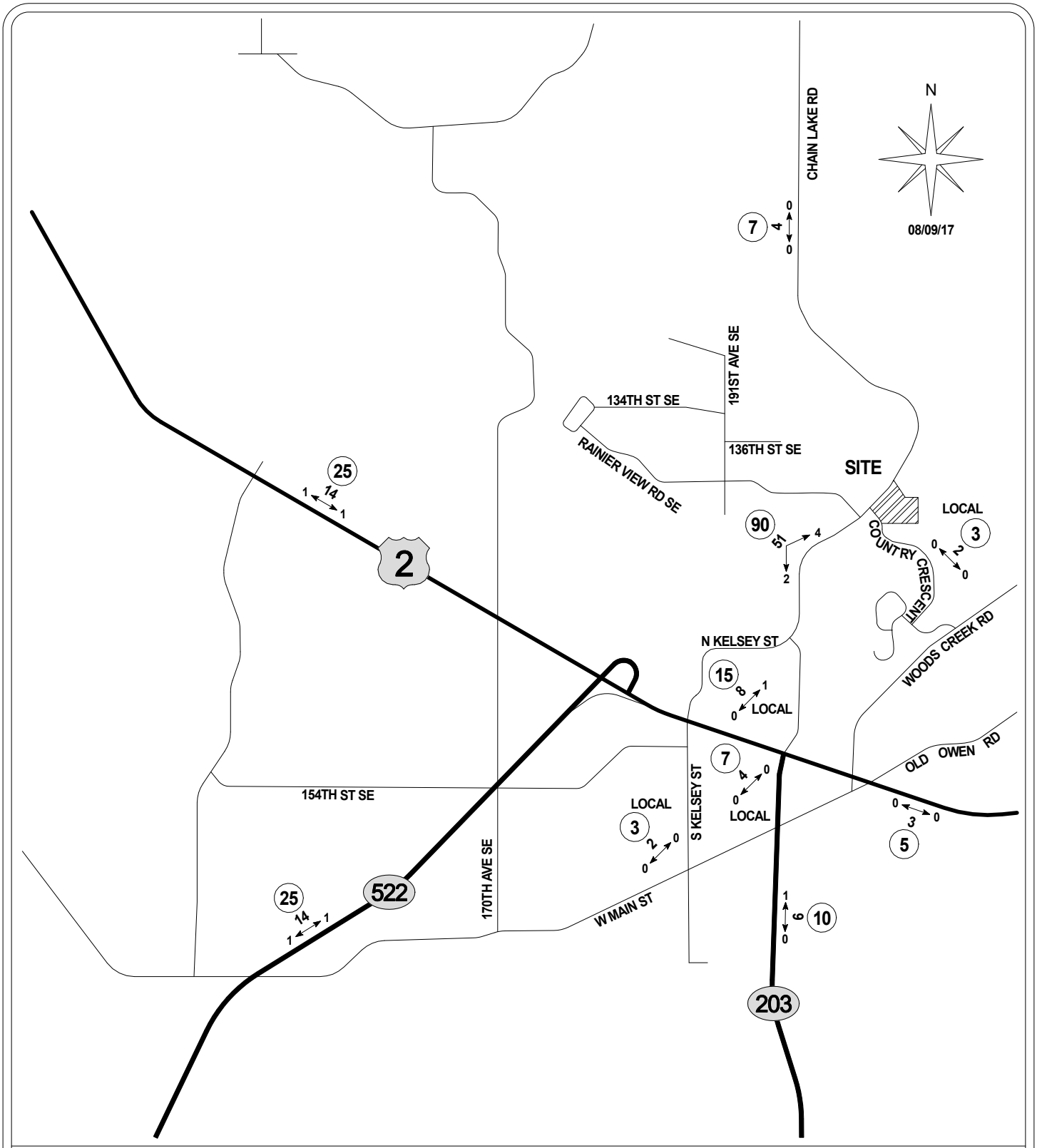
CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #17-167

CLOTHIER SHORT PLAT
6 NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR

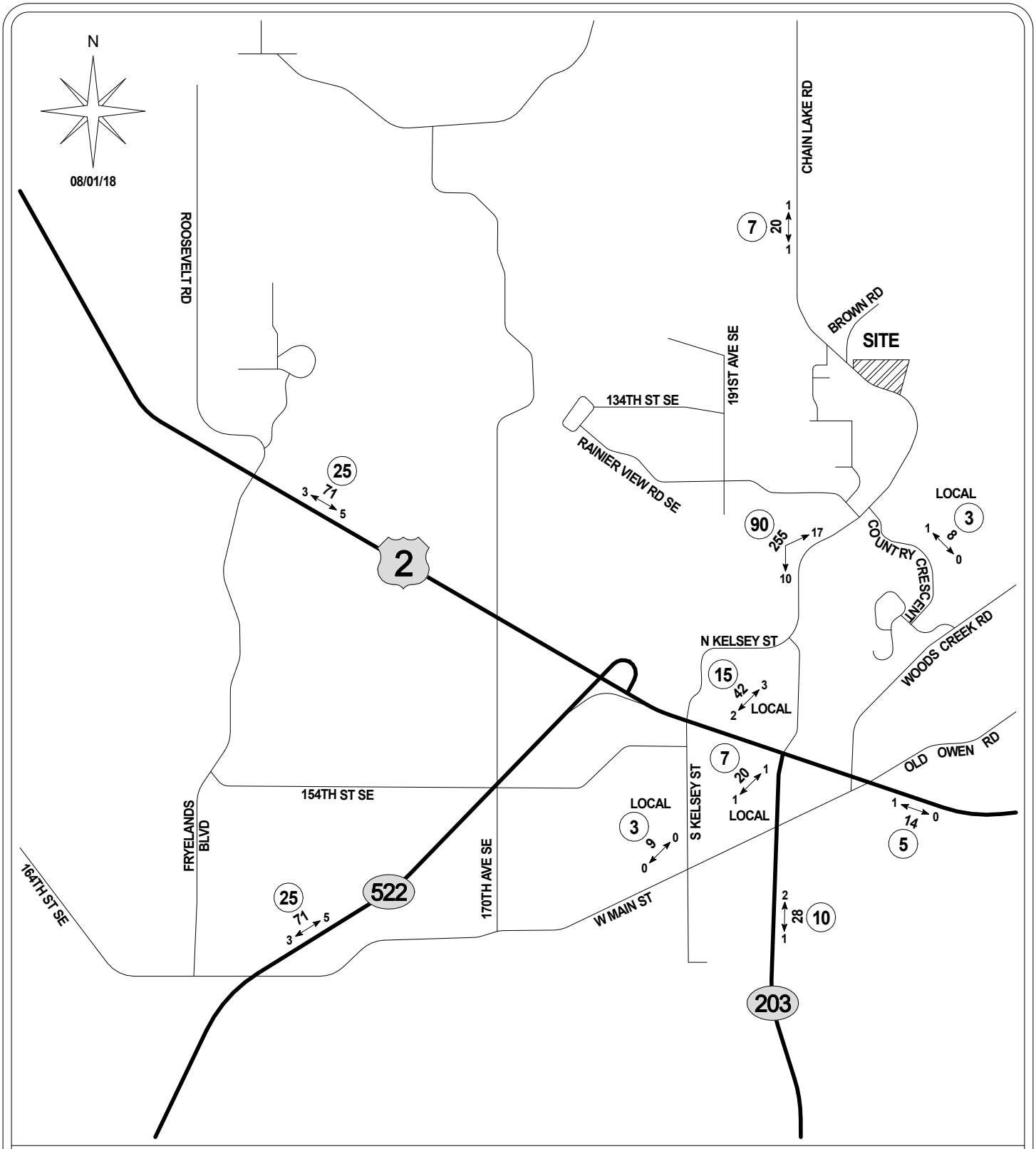
2 Short Plats North of Easton
Cove Trip Generation

Eaglemont 7
GTC #18-042

PM Peak-Hour

%	New ADT	New PM Peak Hour Trips		
		In	Out	Total
100%	94	6	4	9.90
1%	0.94	0.06	0.04	0.10
2%	1.89	0.12	0.07	0.20
3%	2.83	0.19	0.11	0.30
4%	3.78	0.25	0.15	0.40
5%	**4.72**	**0.31**	**0.18**	**0.50**
6%	5.66	0.37	0.22	0.59
7%	6.61	0.44	0.26	0.69
8%	7.55	0.50	0.29	0.79
9%	8.50	0.56	0.33	0.89
10%	**9.44**	**0.62**	**0.37**	**0.99**
11%	10.38	0.69	0.40	1.09
12%	11.33	0.75	0.44	1.19
13%	12.27	0.81	0.48	1.29
14%	13.22	0.87	0.51	1.39
15%	**14.16**	**0.94**	**0.55**	**1.49**
16%	15.10	1.00	0.59	1.58
17%	16.05	1.06	0.62	1.68
18%	16.99	1.12	0.66	1.78
19%	17.94	1.19	0.70	1.88
20%	**18.88**	**1.25**	**0.73**	**1.98**
21%	19.82	1.31	0.77	2.08
22%	20.77	1.37	0.81	2.18
23%	21.71	1.44	0.84	2.28
24%	22.66	1.50	0.88	2.38
25%	**23.60**	**1.56**	**0.92**	**2.48**
26%	24.54	1.62	0.95	2.57
27%	25.49	1.68	0.99	2.67
28%	26.43	1.75	1.02	2.77
29%	27.38	1.81	1.06	2.87
30%	**28.32**	**1.87**	**1.10**	**2.97**
31%	29.26	1.93	1.13	3.07
32%	30.21	2.00	1.17	3.17
33%	31.15	2.06	1.21	3.27
34%	32.10	2.12	1.24	3.37
35%	**33.04**	**2.18**	**1.28**	**3.47**
36%	33.98	2.25	1.32	3.56
37%	34.93	2.31	1.35	3.66
38%	35.87	2.37	1.39	3.76
39%	36.82	2.43	1.43	3.86
40%	**37.76**	**2.50**	**1.46**	**3.96**
41%	38.70	2.56	1.50	4.06
42%	39.65	2.62	1.54	4.16
43%	40.59	2.68	1.57	4.26
44%	41.54	2.75	1.61	4.36
45%	**42.48**	**2.81**	**1.65**	**4.46**
46%	43.42	2.87	1.68	4.55
47%	44.37	2.93	1.72	4.65
48%	45.31	3.00	1.76	4.75
49%	46.26	3.06	1.79	4.85
50%	**47.20**	**3.12**	**1.83**	**4.95**

%	New ADT	New PM Peak Hour Trips		
		In	Out	Total
100%	94	6	4	10
51%	48.14	3.18	1.87	5.05
52%	49.09	3.24	1.90	5.15
53%	50.03	3.31	1.94	5.25
54%	50.98	3.37	1.98	5.35
55%	**51.92**	**3.43**	**2.01**	**5.45**
56%	52.86	3.49	2.05	5.54
57%	53.81	3.56	2.09	5.64
58%	54.75	3.62	2.12	5.74
59%	55.70	3.68	2.16	5.84
60%	**56.64**	**3.74**	**2.20**	**5.94**
61%	57.58	3.81	2.23	6.04
62%	58.53	3.87	2.27	6.14
63%	59.47	3.93	2.31	6.24
64%	60.42	3.99	2.34	6.34
65%	**61.36**	**4.06**	**2.38**	**6.44**
66%	62.30	4.12	2.42	6.53
67%	63.25	4.18	2.45	6.63
68%	64.19	4.24	2.49	6.73
69%	65.14	4.31	2.53	6.83
70%	**66.08**	**4.37**	**2.56**	**6.93**
71%	67.02	4.43	2.60	7.03
72%	67.97	4.49	2.64	7.13
73%	68.91	4.56	2.67	7.23
74%	69.86	4.62	2.71	7.33
75%	**70.80**	**4.68**	**2.75**	**7.43**
76%	71.74	4.74	2.78	7.52
77%	72.69	4.80	2.82	7.62
78%	73.63	4.87	2.85	7.72
79%	74.58	4.93	2.89	7.82
80%	**75.52**	**4.99**	**2.93**	**7.92**
81%	76.46	5.05	2.96	8.02
82%	77.41	5.12	3.00	8.12
83%	78.35	5.18	3.04	8.22
84%	79.30	5.24	3.07	8.32
85%	**80.24**	**5.30**	**3.11**	**8.42**
86%	81.18	5.37	3.15	8.51
87%	82.13	5.43	3.18	8.61
88%	83.07	5.49	3.22	8.71
89%	84.02	5.55	3.26	8.81
90%	**84.96**	**5.62**	**3.29**	**8.91**
91%	85.90	5.68	3.33	9.01
92%	86.85	5.74	3.37	9.11
93%	87.79	5.80	3.40	9.21
94%	88.74	5.87	3.44	9.31
95%	**89.68**	**5.93**	**3.48**	**9.41**
96%	90.62	5.99	3.51	9.50
97%	91.57	6.05	3.55	9.60
98%	92.51	6.12	3.59	9.70
99%	93.46	6.18	3.62	9.80
100%	**94.40**	**6.24**	**3.66**	**9.90**



G IBSON T RAFFIC C ONSULTANTS

TRAFFIC IMPACT STUDY
GTC #18-042

KESTREL RIDGE
30 NEW SINGLE FAMILY DWELLINGS

CITY OF MONROE

LEGEND

AWDT
PM ↔ PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR

Level of Service Calculations

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	102	130	409	254	8
Future Vol, veh/h	6	102	130	409	254	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	89	89	89	89
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	7	113	146	460	285	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1042	290	294	0	-	0
Stage 1	290	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	256	752	1273	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	468	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	227	752	1273	-	-	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	674	-	-	-	-	-
Stage 2	468	-	-	-	-	-

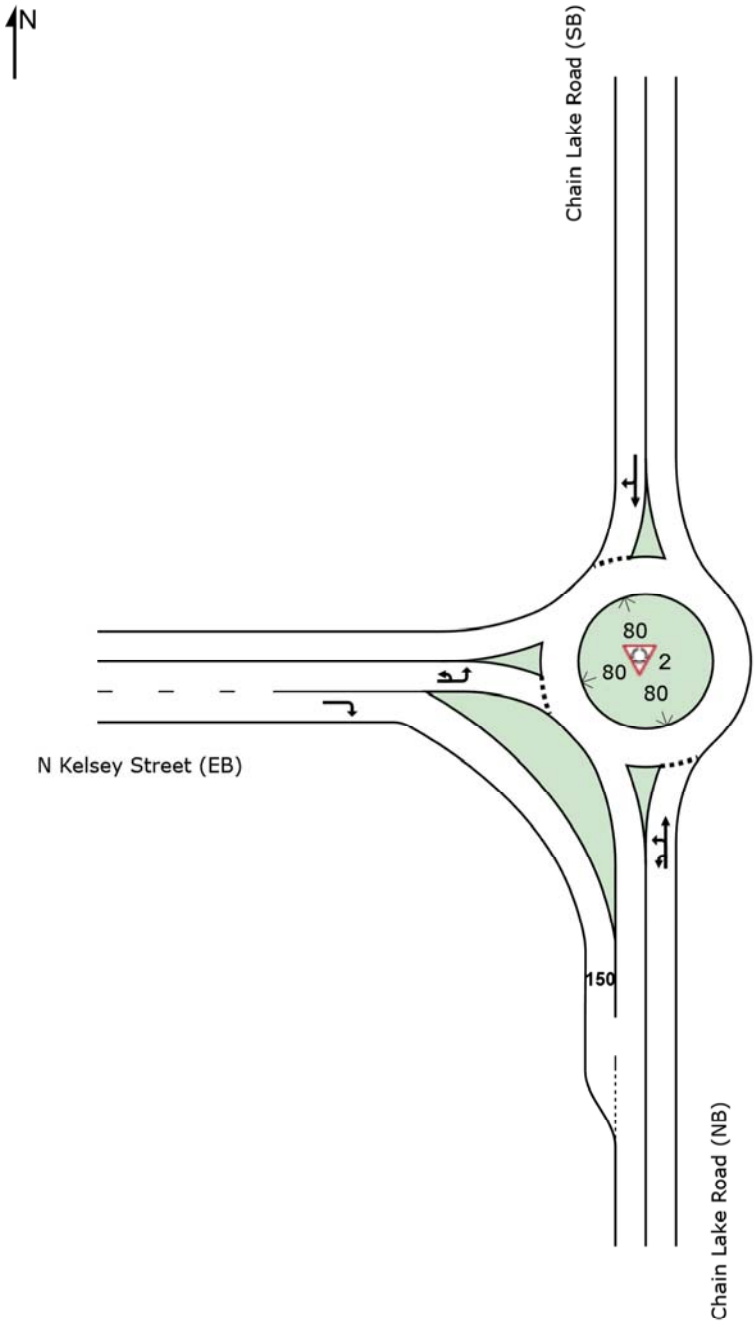
Approach	EB	NB	SB
HCM Control Delay, s	11.6	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1273	-	666	-	-
HCM Lane V/C Ratio	0.115	-	0.18	-	-
HCM Control Delay (s)	8.2	-	11.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.7	-	-

SITE LAYOUT

Site: 2 [2018 Existing Conditions]

Chain Lake Road at N Kelsey Street
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 2 [2018 Existing Conditions]

Chain Lake Road at N Kelsey Street
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Chain Lake Road (NB)												
3u	U	3	3.0	0.397	14.2	LOS B	2.7	68.8	0.63	0.71	0.63	35.2
3	L2	146	3.0	0.397	12.0	LOS B	2.7	68.8	0.63	0.71	0.63	34.5
8	T1	247	3.0	0.397	6.7	LOS A	2.7	68.8	0.63	0.71	0.63	34.6
Approach		397	3.0	0.397	8.7	LOS A	2.7	68.8	0.63	0.71	0.63	34.5
North: Chain Lake Road (SB)												
4	T1	132	3.0	0.369	5.3	LOS A	2.7	68.1	0.46	0.54	0.46	36.2
14	R2	298	3.0	0.369	5.2	LOS A	2.7	68.1	0.46	0.54	0.46	35.2
Approach		430	3.0	0.369	5.2	LOS A	2.7	68.1	0.46	0.54	0.46	35.5
West: N Kelsey Street (EB)												
5u	U	5	3.0	0.248	12.3	LOS B	1.6	40.7	0.35	0.62	0.35	34.4
5	L2	349	3.0	0.248	10.1	LOS B	1.6	40.7	0.35	0.62	0.35	33.8
12	R2	195	3.0	0.120	3.8	LOS A	0.0	0.0	0.00	0.47	0.00	36.8
Approach		549	3.0	0.248	7.9	LOS A	1.6	40.7	0.23	0.57	0.23	34.8
All Vehicles		1376	3.0	0.397	7.3	LOS A	2.7	68.8	0.42	0.60	0.42	34.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	9.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	19	228	336	599	368	29
Future Vol, veh/h	19	228	336	599	368	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	89	89	89	89
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	21	253	378	673	413	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1859	430	446	0	-	0
Stage 1	430	-	-	-	-	-
Stage 2	1429	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	81	627	1120	-	-	-
Stage 1	658	-	-	-	-	-
Stage 2	222	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	54	627	1120	-	-	-
Mov Cap-2 Maneuver	54	-	-	-	-	-
Stage 1	436	-	-	-	-	-
Stage 2	222	-	-	-	-	-

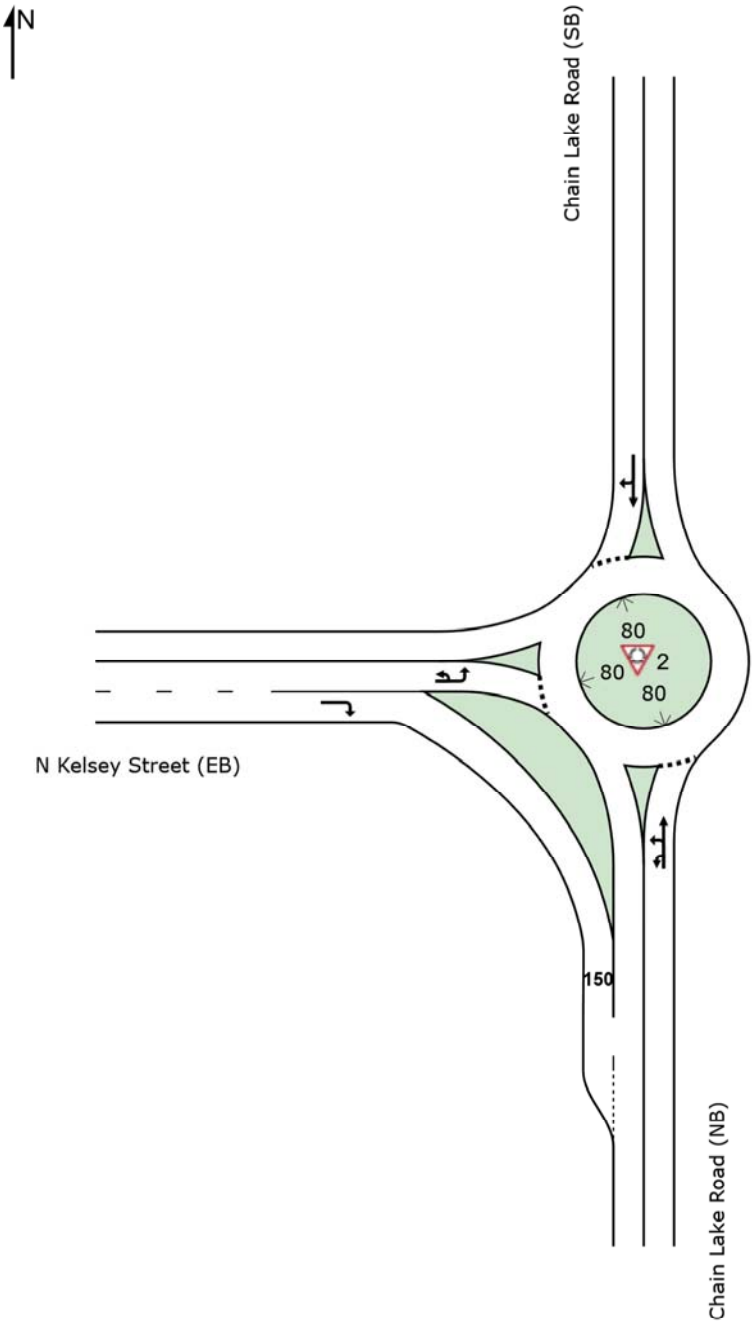
Approach	EB	NB	SB
HCM Control Delay, s	45.9	3.5	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1120	-	345	-	-
HCM Lane V/C Ratio	0.337	-	0.795	-	-
HCM Control Delay (s)	9.8	-	45.9	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	1.5	-	6.7	-	-

SITE LAYOUT

Site: 2 [2028 Baseline Conditions]

Chain Lake Road at N Kelsey Street
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 2 [2028 Baseline Conditions]

Chain Lake Road at N Kelsey Street
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Chain Lake Road (NB)												
3u	U	4	3.0	0.722	21.9	LOS C	9.0	231.5	0.96	1.10	1.36	32.0
3	L2	178	3.0	0.722	19.6	LOS B	9.0	231.5	0.96	1.10	1.36	31.4
8	T1	394	3.0	0.722	14.4	LOS B	9.0	231.5	0.96	1.10	1.36	31.4
Approach		576	3.0	0.722	16.0	LOS B	9.0	231.5	0.96	1.10	1.36	31.4
North: Chain Lake Road (SB)												
4	T1	205	3.0	0.597	6.0	LOS A	5.8	148.5	0.68	0.61	0.68	35.6
14	R2	455	3.0	0.597	5.9	LOS A	5.8	148.5	0.68	0.61	0.68	34.7
Approach		660	3.0	0.597	5.9	LOS A	5.8	148.5	0.68	0.61	0.68	35.0
West: N Kelsey Street (EB)												
5u	U	6	3.0	0.432	12.9	LOS B	3.4	87.6	0.54	0.66	0.54	34.0
5	L2	568	3.0	0.432	10.6	LOS B	3.4	87.6	0.54	0.66	0.54	33.4
12	R2	238	3.0	0.146	3.8	LOS A	0.0	0.0	0.00	0.47	0.00	36.8
Approach		812	3.0	0.432	8.7	LOS A	3.4	87.6	0.38	0.61	0.38	34.3
All Vehicles		2048	3.0	0.722	9.8	LOS A	9.0	231.5	0.64	0.75	0.75	33.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	9.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	19	234	346	599	368	29
Future Vol, veh/h	19	234	346	599	368	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	89	89	89	89
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	21	260	389	673	413	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1881	430	446	0	-	0
Stage 1	430	-	-	-	-	-
Stage 2	1451	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	79	627	1120	-	-	-
Stage 1	658	-	-	-	-	-
Stage 2	217	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	52	627	1120	-	-	-
Mov Cap-2 Maneuver	52	-	-	-	-	-
Stage 1	430	-	-	-	-	-
Stage 2	217	-	-	-	-	-

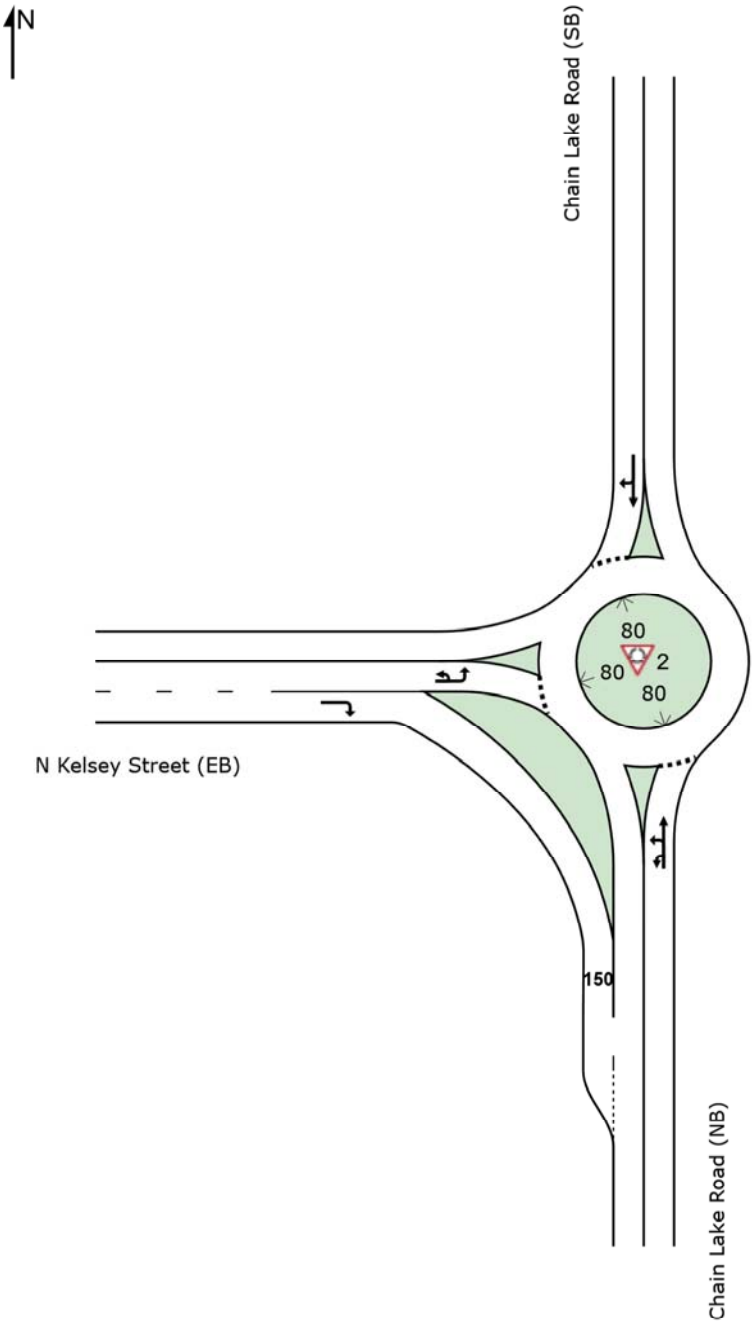
Approach	EB	NB	SB
HCM Control Delay, s	49.2	3.6	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1120	-	343	-	-
HCM Lane V/C Ratio	0.347	-	0.82	-	-
HCM Control Delay (s)	9.9	-	49.2	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	1.6	-	7.1	-	-

SITE LAYOUT

Site: 2 [2028 Future Conditions w Development]

Chain Lake Road at N Kelsey Street
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 2 [2028 Future Conditions w Development]

Chain Lake Road at N Kelsey Street
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Chain Lake Road (NB)												
3u	U	4	3.0	0.732	22.4	LOS C	9.4	240.0	0.97	1.12	1.39	31.7
3	L2	178	3.0	0.732	20.1	LOS C	9.4	240.0	0.97	1.12	1.39	31.2
8	T1	397	3.0	0.732	14.8	LOS B	9.4	240.0	0.97	1.12	1.39	31.2
Approach		580	3.0	0.732	16.5	LOS B	9.4	240.0	0.97	1.12	1.39	31.2
North: Chain Lake Road (SB)												
4	T1	206	3.0	0.603	6.0	LOS A	5.9	151.5	0.69	0.62	0.69	35.6
14	R2	460	3.0	0.603	5.9	LOS A	5.9	151.5	0.69	0.62	0.69	34.7
Approach		667	3.0	0.603	5.9	LOS A	5.9	151.5	0.69	0.62	0.69	34.9
West: N Kelsey Street (EB)												
5u	U	6	3.0	0.438	12.9	LOS B	3.5	89.6	0.54	0.66	0.54	34.0
5	L2	575	3.0	0.438	10.7	LOS B	3.5	89.6	0.54	0.66	0.54	33.3
12	R2	238	3.0	0.146	3.8	LOS A	0.0	0.0	0.00	0.47	0.00	36.8
Approach		819	3.0	0.438	8.7	LOS A	3.5	89.6	0.38	0.61	0.38	34.3
All Vehicles		2066	3.0	0.732	10.0	LOS A	9.4	240.0	0.65	0.75	0.77	33.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

RECEIVED
05/14/2019
CITY OF MONROE

Office Use: DR#_____

ATTACHMENT #15

ENGINEERING DESIGN AND DEVELOPMENT STANDARDS

DEVIATION REQUEST

City of Monroe
806 West Main Street
Monroe, WA 98272
Phone: 360-794-7400
Fax: 360-794-4007
www.monroewa.gov

DEVIATION FROM STANDARDS

Request to deviate from the following design elements *(please check all that apply):*

Design Standards:	☐ Clearing/Grading	☐ Water Facilities	☐ Sanitary Sewer Facilities	☒ Streets	☐ Other
Surface Water Management:	☐ Erosion & Sediment Control	☐ Storm Facilities	☐ Minimum Requirements	☐ Other	
Engineering Construction Standards:	☐ Construction Standards	☒ Standard Details	☐ Other		

PROJECT INFORMATION

Project Name: Belmont Terrace PRD **Date:** 5/13/19

Project Address: 18830 134th Street SE, Monroe, WA **Zip:** 98272

Parcel No(s): 28063600101900

Project Number:

Related Applications:

ENGINEER

Company Name: CPH Consultants **Phone:** 425-285-2390

Contact Person: Matt Hough, PE **Email:** matt@cphconsultants.com

Address: 11431 Willows Road NE, #120 **City:** Redmond **State:** WA **Zip:** 98052

Received

OWNER

Name: Mateo & Bella Barajas ☒ Individual ☐ Corporation ☐ Partnership ☐ LLC

Contact Person: Mateo Barajas **Phone:** 425-239-8462 **Email:**

Address: 21020 Calhoun Road **City:** Monroe **State:** WA **Zip:** 98272

APPLICANT

☐ Owner ☒ Owner Agent ☐ Contractor ☐ Engineer ☐ Architect ☐ Other:

Company Name: CPH Consultants

Contact Person: Matt Hough, PE **Phone:** 425-285-2390 **Email:** matt@cphconsultants.com

Address: 11431 Willows Road NE, #120 **City:** Redmond **State:** WA **Zip:** 98052

I certify that I have read this application and declare under penalty of perjury that the information contained herein is correct and complete. I am either the owner of the property on this permit application or I represent the owner as signified above and am acting with the owner's full knowledge and consent.

Signature: _____ **Printed Name:** Matthew Hough **Date:** 5/13/19

ENGINEERING DESIGN AND DEVELOPMENT STANDARDS

DEVIATION REQUEST

A. Deviation Request:

1. Identify the engineering standard(s) proposed for deviation (include section or drawing numbers):

This Deviation Request proposes a modified roadway section from City of Monroe Public Works Design and Development Standards (PWDDS) standard drawing 303A for the on-site private roads (PAT1, PAT2, and PAT3).

2. Describe the deviation request, including reasons for the request and why the applicable engineering standard cannot be met. Include site-specific details as applicable.

This Deviation Request proposes a private road section of 20 feet of reverse crown pavement in a 20-foot wide private tract, with a 5-foot at-grade sidewalk behind the pavement on at least one side for the on-site private roads (PAT1, PAT2, and PAT3). This request allows additional space behind the back of sidewalk to facilitate on-site grading.

B. Justification: Deviation requests must include supporting information showing compliance with the following criteria:

3. Describe how the deviation will still achieve the intent of the engineering standard:

This Deviation Request will achieve the intent of the engineering standard because the proposed modified road section maintains the same widths of pavement and sidewalk as standard drawing 303A. PAT1 proposes sidewalk on only the west side of the road which fronts Lots 4 - 7. Sidewalk does not appear necessary along the east side of PAT1 because there is only the side yard for Lot 8 east of PAT1.

4. Describe how the deviation will not adversely affect road safety or operation:

This Deviation Request will not adversely affect road safety or operation because the proposed modified road section maintains all the neccessary road elements, including the same pavement and sidewalk widths as standard drawing 303A.

5. Describe how the deviation will provide substantially equivalent environmental protection:

This Deviation Request will provide substantially equivalent environmental protection because the proposed modified road section maintains the same widths of pavement and sidewalk as standard drawing 303A, no additional impervious surface is proposed. The reverse crown pavement section is a more efficient design since fewer catch basins and less storm drainage pipe will be required.

6. Describe how the deviation will not adversely affect road maintenance and associated costs:

This Deviation Request will not adversely affect road maintenance and associated costs because the proposed modified road section maintains the same pavement and sidewalk widths as standard drawing 303A and reduces the amount of catch basin inlets.

7. Describe how the deviation will not adversely affect aesthetic appearance of roads or property:

This Deviation Request will not adversely affect aesthetic appearance of the roads or property. The proposed modified road section will provide slightly more "green" space along the length of the private roads since the proposed road section does not include curbs.

C. Recommendation:

☐ Approved

☐ Denied

☐ Modified Approval _____

_____

_____

_____

Conditions:

DESIGN & CONSTRUCTION DIVISION STAFF RECOMMENDATION:

_____

Development Engineer/Designee Date

D. Decision:

PUBLIC WORKS DEPARTMENT AUTHORIZATION:

☐ Concur with recommendation

☐ Remand to Staff

_____

City Engineer Date

January 29, 2019

D.R. Horton, America's Builder
Attn: Jennifer Reiner
11241 Slater Avenue NE, #200
Kirkland, WA 98033

RE: Existing Conditions Report for Snohomish County Parcel 28063600101900

Wetland Resources, Inc. (WRI) conducted a site investigation on December 14, 2018 to locate jurisdictional wetlands and streams on and in the vicinity of the subject property, located at 18830 134th St SE in the City of Monroe, WA. The subject site is rectangular in shape and is comprised of one parcel (Snohomish County Parcel 28063600101900), further located as a portion of Section 36, Township 28N, Range 6E, W.M. The site is located within the French Creek sub-basin of the Snohomish watershed (Water Resources Inventory Area 7).

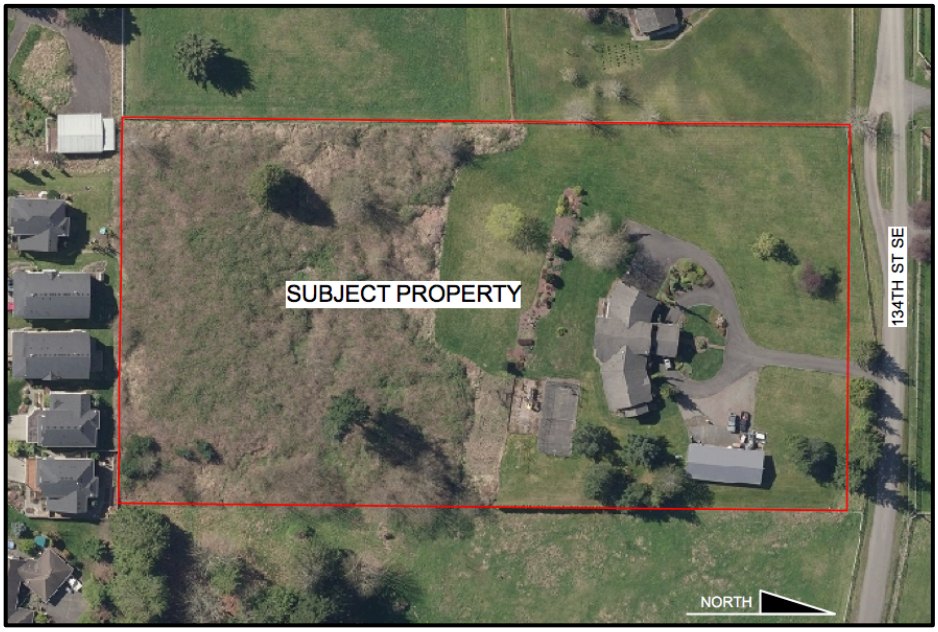


Figure 1: Aerial view of the subject property (not to scale)

The subject property is approximately 4.77-acres, located in an urban residential setting, south of the Snohomish County/City of Monroe border. The investigation area is currently developed in the north half of the site, with a single-family residence (SFR), garage, and associated infrastructure. Topography across the subject property generally slopes to the south. In the northern portion of the subject property, where the SFR is located, these slopes are more gradual (approximately 8 percent), becoming steeper (approximately 14 percent) in the southern region.

1.0 REVIEW OF PUBLICLY AVAILABLE INFORMATION

Prior to conducting the site reconnaissance, publicly available information was reviewed to gather background information on the subject property and the surrounding area in regards to wetlands, streams, and other critical areas. These sources include the following:

- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI): NWI does not show any wetlands or streams on the subject property.

- USDA/Natural Resources Conservation Service (NRCS) Web Soil Survey: The Web Soil Survey indicates that the subject property is underlain by Tokul gravelly medial loam, 0 to 8 and 8 to 15 percent slopes. Soils located in the investigation area are similar to this series.

- Washington Department of Fish and Wildlife (WDFW) SalmonScape Interactive Mapping System: The SalmonScape interactive map shows the closest mapped feature to be an unnamed, non-fish habitat tributary to French Creek, over 1,000 feet northwest of the subject property.
- WDFW Priority Habitat and Species (PHS) Interactive Map: PHS does not map any features in the vicinity of the subject property.

- Washington Department of Natural Resources (WA DNR) Forest Practices Application Mapping Tool (FPAMT): This resource mirrors the results of SalmonScape, showing no features on-site and a non-fish stream (tributary to French Creek) over 1,000 feet off-site to the northwest.

- Snohomish County PDS Map Portal: The PDS Map Portal mirrors the results of the previous resources, showing no features on-site and a non-fish stream (tributary to French Creek) over 1,000 feet off-site to the northwest.

2.0 DETERMINATION METHODOLOGY

The ordinary high water marks (OHWM) of streams and waterbodies, if present, were identified using the methodology described in: *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et al 2016).

Wetland areas, if present, were determined using the routine determination approach described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (U.S. Army Corps of Engineers 2010). Under the routine methodology, the process for making a wetland determination is based on three steps:

1.) Examination of the site for hydrophytic vegetation (species present and percent cover);

2.) Examination of the site for hydric soils;

3.) Determining the presence of wetland hydrology

2.1 HYDROPHYTIC VEGETATION CRITERIA

The Corps Manual and 2010 Regional Supplement define hydrophytic vegetation as "the assemblage of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence." Field indicators are used to determine whether the hydrophytic vegetation criteria have been met. Examples of these indicators include, but are not limited to, the rapid test for hydrophytic vegetation, a dominance test result of greater than 50%, and/or a prevalence index score less than or equal to 3.0.

2.2 SOILS CRITERIA AND MAPPED DESCRIPTION

The manuals define hydric soils as those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Field indicators are used for determining whether a given soil meets the definition for hydric soils.

The Tokul gravelly medial loam series is described as moderately deep, moderately well drained soil on till plains. This soil formed in glacial till and volcanic ash. Typically, the surface is covered with a mat of leaves, twigs, and decomposed litter about two inches thick. The surface layer is dark brown gravelly loam about 4 inches thick. The subsoil is brown, strong brown, and dark yellowish-brown gravelly loam about 18 inches thick. A hardpan is at a depth of about 31 inches. Permeability of this soil is moderate above the hardpan and very slow through it. Available water capacity is moderate. Included in this unit are areas of soils that have slopes of more than 8 percent, McKenna and Norma soils in depressional areas along drainageways on till plains, Terric Medisaprists in depressional areas on till plains, Winston and Pastik soils on terraces and outwash plains, and Ragnar soils on outwash plains. Included areas make up about 25 percent of the total acreage. McKenna and Norma soils are listed as hydric on the Hydric Soils List for Washington State.

2.3 HYDROLOGY CRITERIA

The 2010 Regional Supplement defines wetland hydrology as "areas that are inundated (flooded or ponded) or the water table is less than or equal to 12 inches below the soil surface for 14 or more consecutive days during the growing season at a minimum frequency of 5 years in 10." During the early growing season, wetland hydrology determinations are made based on physical observation of surface water, a high-water table, or saturation in the upper 12 inches. Outside of the early

growing season, wetland hydrology determinations are made based on physical evidence of recent inundation or saturation (i.e. water marks, surface soil cracks, water-stained leaves).

2.3.1 Precipitation Analysis

Available precipitation data was collected from the Monroe, WA (AgACIS for Snohomish County) weather station for the months of August through December. According to the Monroe, WA weather station data, based on WETS table analysis, the period prior to the December 2018 site investigation by WRI (October through November, 2018) was normal.

In the short-term, preceding WRI's December 14, 2018 investigation, there were 2 significant rain events on December 9 and 11, 2018. In these two days, rain fall was 3.4 to 4.7 times the normal level of precipitation. Although significant rainfall had occurred preceding the site visit, none of the areas across the site had saturated soils or met hydric soil indicators. Which indicates that water capacity for the on-site soils is very low. The property was not found to meet wetland criteria on the basis of wetland soils and hydrology.

3.0 RESULTS

Vegetation on the subject property includes, red alder (*Alnus rubra*; FAC), shore pine (*Pinus contorta*; FAC), Himalayan blackberry (*Rubus armeniacus*; FAC), creeping buttercup (*Ranunculus repens*; FAC), hairy cat's ear (*Hypochaeris radicata*; FACU), and isolated patches of reed canarygrass (*Phalaris arundinacea*; FACW). Multiple soils samples were gathered across the subject property. Generally, in the upper layer, soils are a very dark grayish brown (10YR 3/2) and a gravelly sandy loam texture. In the sublayer, soils are generally dark brown to dark yellowish brown (10YR 3/4, 10YR 3/3) with varying degrees (5 to 7 percent) of strong brown and dark yellowish brown (7.5YR 4/6, 10YR 4/6) redoximorphic features, and a sandy loam texture. No evidence of hydrology was present at the time of the December 2018 site investigation.

Based on the results of the site visits, no wetlands or streams were identified within the investigation area. No off-site wetlands or streams were noted within 300 feet of the subject property. Development of the subject property will not impact any critical areas or their buffers.

USE OF THIS REPORT

This Existing Conditions Report is supplied to D.R. Horton, America's Builder as a means of determining the presence of on-site and nearby critical areas as required by the City of Monroe. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to critical areas are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

This report conforms to the standard of care employed by ecologists. No other representation or

warranty is made concerning the work or this report and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.

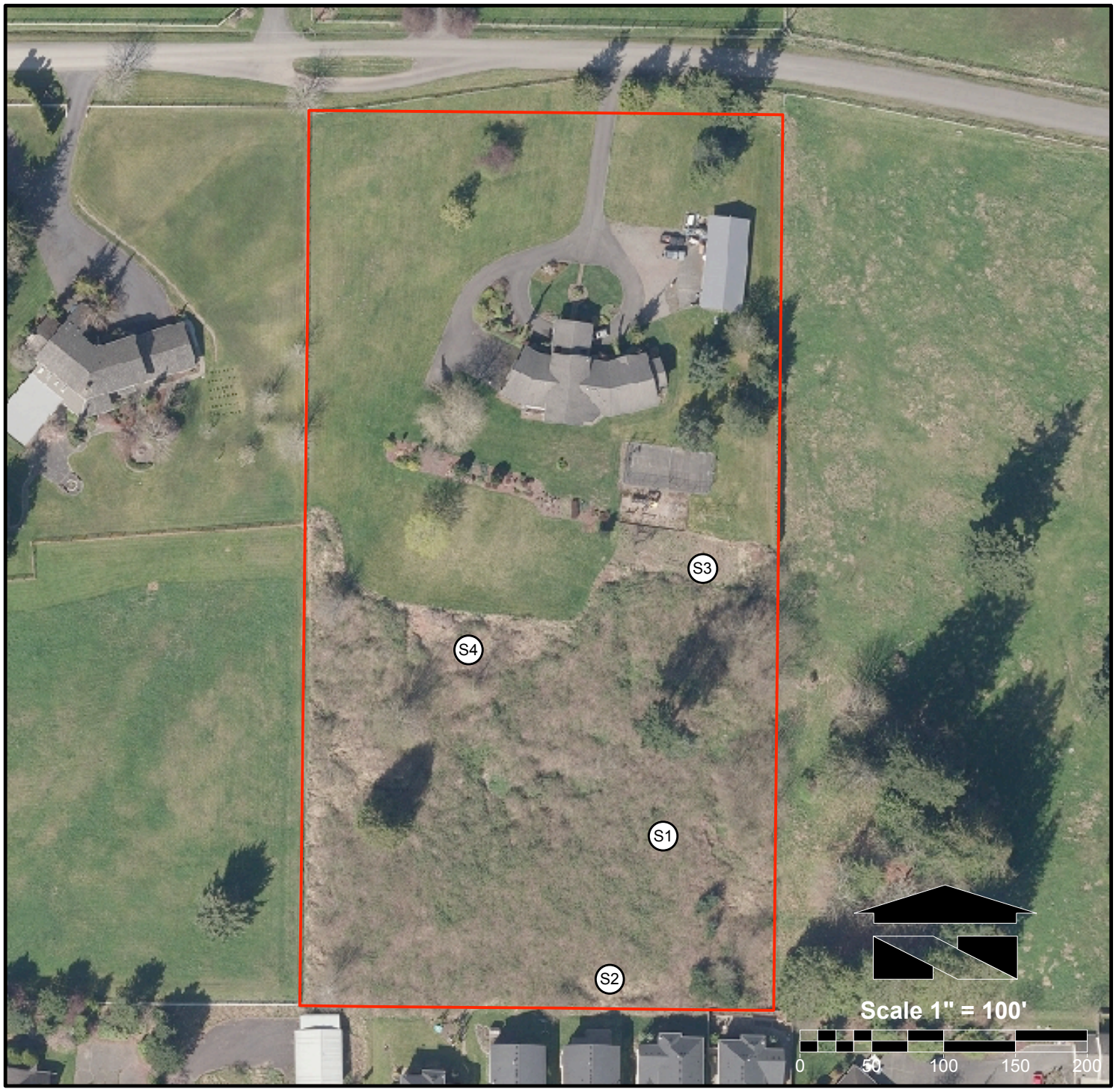
Jeff Mallahan
Senior Ecologist

Enclosure: Reconnaissance Map (Sheet 1/1)
USACE Data Sheets (S1-S4)

EXISTING CONDITIONS MAP

D.R. HORTON - BARAJAS

PORTION OF SECTION 36, TOWNSHIP 28N, RANGE 06E W.M.



LEGEND

- WETLAND
- PROPERTY BOUNDARY
- S1 — S2 DATA SITES

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources .com

Existing Conditions Map
D R Horton - Barajas
City Of Monroe

D.R. Horton
Attn: Katie Stecks
11240 Slater Ave NE, #200
Kirkland, WA 98272

Sheet 1/1
WRI#: 18384
Drawn by: JM
1/29/2019

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 18384 Barajas City/County: Monroe / Snohomish Sampling Date: 12/14/18

Applicant/Owner: DR Horton State: WA Sampling Point: S1

Investigator(s): JM, EC Section, Township, Range: S38, T28N, R06E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): slope Slope (%): 10

Subregion (LRR): LRR-A Lat: 47.8742433 Long: -121.9778681 Datum: NAD83

Soil Map Unit Name: Tokul gravelly medial loam, 8 to 15 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑
Hydric Soil Present?	Yes ☐ No ☑	
Wetland Hydrology Present?	Yes ☐ No ☑	

Remarks:

In shallow depression on slope above house #2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m^2)			
1. Rubus armeniacus	100	Y	FAC
2.			
3.			
4.			
5.			
	100 = Total Cover		
Herb Stratum (Plot size: 1m^2)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: 3m^2)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 100

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 = 0
FACW species	x 2 = 0
FAC species	x 3 = 0
FACU species	x 4 = 0
UPL species	x 5 = 0
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☑ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: S1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100					Gravelly sandy loam	
6-16	10YR 3/4	100					Sandy Loam	
16+	10YR 3/4	95	7.5YR 4/6	5	C	M	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 18384 Barajas City/County: Monroe / Snohomish Sampling Date: 12/14/18

Applicant/Owner: DR Horton State: WA Sampling Point: S2

Investigator(s): JM, EC Section, Township, Range: S38, T28N, R06E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): slope Slope (%): 10

Subregion (LRR): LRR-A Lat: 47.8742433 Long: -121.9778681 Datum: NAD83

Soil Map Unit Name: Tokul gravelly medial loam, 8 to 15 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☑ No ☐ Hydric Soil Present? Yes ☐ No ☑ Wetland Hydrology Present? Yes ☐ No ☑	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑

Remarks:

Downslope of S1 on shelf on slope

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus contorta	5	Y	FAC
2.			
3.			
4.			
	5	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m^2)			
1. Rubus armeniacus	100	Y	FAC
2.			
3.			
4.			
5.			
	100	= Total Cover	
Herb Stratum (Plot size: 1m^2)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0	= Total Cover	
Woody Vine Stratum (Plot size: 3m^2)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 100

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	0
FACW species	x 2 =	0
FAC species	x 3 =	0
FACU species	x 4 =	0
UPL species	x 5 =	0
Column Totals: 0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☑ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: S2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					Gravelly Sandy Loam	
8-16	10YR 3/3	95	7.5YR 4/6	5	C	M	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 18384 Barajas City/County: Monroe / Snohomish Sampling Date: 12/14/18

Applicant/Owner: DR Horton State: WA Sampling Point: S3

Investigator(s): JM, EC Section, Township, Range: S38, T28N, R06E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): slope Slope (%): 10

Subregion (LRR): LRR-A Lat: 47.8742433 Long: -121.9778681 Datum: NAD83

Soil Map Unit Name: Tokul gravelly medial loam, 8 to 15 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑
Hydric Soil Present?	Yes ☐ No ☑	
Wetland Hydrology Present?	Yes ☐ No ☑	

Remarks:

Edge of disturbed soil area

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	10	Y	FAC
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m^2)			
1. Rubus armeniacus	15	Y	FAC
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: 1m^2)			
1. Ranunculus repens	65	Y	FAC
2. Agrostis sp.	10	N	FAC
3. Hypocharis radicata	10	N	FACU
4. Plantago lanceolata	5	N	FACU
5. Holcus lanatus	Trace	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 3m^2)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 = 0
FACW species	x 2 = 0
FAC species	x 3 = 0
FACU species	x 4 = 0
UPL species	x 5 = 0
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☑ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: S3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Gravelly Sandy Loam	
6-12	10YR 3/3	93	10YR 4/6	7	C	M	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 18384 Barajas City/County: Monroe / Snohomish Sampling Date: 12/14/18

Applicant/Owner: DR Horton State: WA Sampling Point: S4

Investigator(s): JM, EC Section, Township, Range: S38, T28N, R06E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): slope Slope (%): 10

Subregion (LRR): LRR-A Lat: 47.8742433 Long: -121.9778681 Datum: NAD83

Soil Map Unit Name: Tokul gravelly medial loam, 8 to 15 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☑ No ☐ Hydric Soil Present? Yes ☑ No ☐ Wetland Hydrology Present? Yes ☐ No ☑	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑

Remarks:

Top of slope, inside reed canarygrass patch

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m^2)			
1. Rubus armeniacus	55	Y	FAC
2.			
3.			
4.			
5.			
	55	= Total Cover	
Herb Stratum (Plot size: 1m^2)			
1. Phalaris arundinacea	95	Y	FACW
2. Cirsium arvense	5	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 3m^2)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 = 0
FACW species	x 2 = 0
FAC species	x 3 = 0
FACU species	x 4 = 0
UPL species	x 5 = 0
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☑ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: S4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	95	7.5YR 4/6	5	C	M	Gravelly Sandy Loam	
12-18	10YR 3/4	93	7.5YR 4/6	7	C	M	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: